Ocean Country Partnership Programme

Status of common breeding and migratory birds in the Maldives

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Authors: Sebastian Steibl[1], Ifham Hassan Zareer[2], Hulwa Khaleel[2], Michael Fox[1], Irthisham Hassan Zareer[2], Hassan Nidham[2], James C. Russell[1]

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[1]: School of Biological Sciences, The University of Auckland, Auckland, New Zealand
[2]: Isles Consulting Pvt. Ltd., Hulhumale, Republic of Maldives

For further information please contact:

Joint Nature Conservation Committee
Quay House
2 East Station Road
Fletton Quays
Peterborough
PE2 8YY
https://jncc.gov.uk/our-work/ocean-country-partnership-programme/
Communications@jncc.gov.uk

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Authors: Sebastian Steibl, Ifham Hassan Zareer, Hulwa Khaleel, Michael Fox, Irthisham Hassan Zareer, Hassan Nidham, James C. Russell

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The Ocean Country Partnership Programme (OCPP) is a bilateral technical assistance and capacity building programme that provides tailored support to countries to manage the marine environment more sustainably, including by strengthening marine science expertise, developing science-based policy and management tools and creating educational resources for coastal communities. The OCPP delivers work under three thematic areas: biodiversity, marine pollution, and sustainable seafood.

Contents

Executive summary

In the Republic of the Maldives, comprising 26 atolls with about 1,200 islands, a variety of breeding, migratory, and overwintering birds from diverse species guilds occur. The Ministry of Tourism and Environment placed 207 bird species under national protection in 2021 (Protected Species Regulation (2021R-25).

For this report, 29 of the 207 species were short-listed based on conservation-priority criteria (those being breeding species and regular non-breeding visitors). This report provides, for the first time, an indication of archipelago-wide breeding and non-breeding distributions for these 29 species on an atoll-level, based on 37 interviews with knowledgeable and expert local community members.

Ten seabird species, 4 heron species, 3 rail species, and 2 native land bird species were reported breeding widespread or locally in the Maldives.

Interviewees noted consistently a decline in abundance and occurrence of seabird breeding throughout the Maldives. Besides seabirds, the Crab-plover (Theyravaa; *Dromas ardeola*), formerly widespread and abundant, has disappeared almost entirely from the Maldives within the last 20–30 years.

Island development, sand mining, deforestation, egg and bird poaching for pet-trade, and direct disturbance of nesting islands by people were identified by interviewees as the main current reasons for seabird decline or entire disappearance of breeding colonies from islands.

Herons, rails, and land birds seem less affected by current threats, although some widespread residents, such as the White-breasted Waterhen (Kanbili; *Amaurornis phoenicurus*), were reported to be in decline or having already extirpated from some islands due to complete deforestation of inhabited islands.

Noting that there are limited data available, key knowledge gaps and next steps identified in this report to be followed up are to: (*i*) ground-truth the breeding status of rare, locally breeding species and key seabird nesting islands that this report identified; (*ii*) develop and establish standardised monitoring protocols that can be used to record long-term status trends of common breeding species in the Maldives; (*iii*) engage with resorts, landowners, and developers to identify pathways for how island development can be offset to provide benefits to breeding seabirds; (*iv*) confirm taxonomic status of at least four potentially endemic (sub-)species in the Maldives; and (*v*) increase public awareness of the occurrence and diversity of birds in the Maldives, and their cultural and social values in the Maldives.

Glossary

Finolhu (plural ‘finolhuthah’) = Dhivehi word for small sandbank islands with low grass, herb, and sometimes shrub vegetation, and no soil development. A highly dynamic landform, often in the centre of lagoons and not along the reef crest.

Hulhangu = The Maldives climate is dominated by monsoons with two predominant seasons. Hulhangu is the Dhivehi name of the southwest monsoon, which lasts from May to November. Hulhangu can be roughly considered as the wet-season.

Huraa / Huraa Gandu / Gaa Huraa = Dhivehi word for small rocky bank islands, consisting of coral rock and conglomerate (unlike finolhu, which are built from fine sand) and no soil development, often with Ironwood (Kuredhi; *Pemphis acidula*) vegetation. Unlike finolhu, they are a more stable landforms, and usually closer to the reef crest.

Iruvai = The Maldives climate is dominated by monsoons with two predominant seasons. Iruvai is the Dhivehi name of the northeast monsoon, which lasts from mid-December to March. Iruvai can be roughly considered the dry-season.

Kulhi (or ‘Kilhi’ in Southern atolls) = Dhivehi word for wetland areas on islands. Kulhi can be both closed lake systems (marine, brackish and freshwater lakes) or partially open and in exchange with the lagoon and includes both permanent and intertidal lakes.

Nakaiy = The Indigenous Maldivian calendar system, dividing the year into 27 distinct seasons. Iruvai has nine nakaiy, while Hulhangu has 18 nakaiy. Each nakaiy lasts a 13–14 day period. Traditional ecological knowledge relates weather patterns, fishing, land-use and agricultural activities, as well as wider environmental phenomena, to the nakaiy.

1. Introduction

Atolls can be biodiversity hotspots for birds. About 25% of the world's tropical seabirds – ca. 31 million birds – are estimated to be nesting on Indo-Pacific atolls (Steibl *et al*., 2024). Furthermore, at least 30 endemic water and land bird species, including ducks, rails, parakeets and passerines, are exclusively found on atolls (Valente *et al*., 2020). Some migratory bird species also rely on atolls either as stepping-stones while on migratory passage, or as their principal overwintering grounds (Marks & Redmond, 1994). Furthermore, high marine productivity around atolls, due to strong upwellings from the Atoll Mass Effect, renders the pelagic waters around atolls important foraging grounds for breeding and non-breeding seabirds, while predator-free islands provide safe roosting havens (Gove *et al*., 2016; Mannocci *et al*., 2014). Despite the importance of atolls to birds, they remain widely overlooked in international conservation strategies and are underrepresented in major island bird conservation and restoration actions, such as invasive species management (Spatz *et al*., 2022) or bird translocation actions (Spatz *et al*., 2023).

The Republic of the Maldives is among the largest collection of atolls under one jurisdiction in the world and constitutes about 60% of all oceanic islands in the Indian Ocean (*ca.* 1,200 Maldivian islands, relative to an estimated total *ca.* 2,000 islands in the entire Indian Ocean basin) (Coffin & Eldholm, 2021). The Maldivian atolls sit along the Central Indian Ocean Chagos-Lakshadweep Ridge, a large coral carbonate mega-platform that stretches from the Adas Bank, Western India (14°N), 2,550 km southward into the Indian Ocean basin (10°S) (Droxler & Jorry, 2021). The geography of the Maldives intersects major oceanic currents and, together with the interacting forces of its overall monsoon-dominated climate, creates major seasonal upwelling events around its atolls (De Falco *et al*., 2024; Su *et al*., 2021). These upwellings fuel the exceptional marine productivity, high coral reef biomass, and abundant marine megafauna in the Maldives. They also sustain rich fishing grounds for the Maldivian tuna fishing industry and create important feeding grounds for tropical seabirds across the Indian Ocean (Anderson *et al*., 2011; Bailey, 1974; Radice *et al*., 2019). Seabirds from breeding populations in the Seychelles, Chagos, Western Australia, the Arabian Seas, and Antarctica migrate into Maldivian waters during their non-breeding season, likely to utilise the high productivity around these atolls (Ali *et al*., 2023; Kavanagh *et al*., 2017; Lavers *et al*., 2019; Le Corre *et al*., 2012; Weimerskirch *et al*., 2006; Weimerskirch *et al*., 2015).

The abundance of seabirds in the Maldives is reflected in local knowledge, particularly in the tuna fisheries, where seabirds are still today the major 'tool' for locating fishing grounds (Jauharee & Adam, 2012). Besides the clear importance of the Maldivian atolls for seabirds, the islands are also potentially important stepping-stones or overwintering grounds for Palearctic and Indian migratory species along the Central Asian Flyway, including waders, land birds, and various species of

herons and allies (Steibl & Laforsch, 2021). Early Western natural historians visiting the Maldives in the 18th and 19th century collected and described at least five apparently endemic (sub-) species of birds in the Maldives, yet these species descriptions have never been validated nor fully recognised internationally (Anderson & Shimal, 2020).

Despite the apparent importance of Maldives for birds, the country has so far received little international attention or support for species conservation and site restoration. Furthermore, the distribution of common breeding and non-breeding bird species remains largely unknown and their status unmonitored to date – a key barrier towards research, conservation, restoration, and policymaking as well as towards wider recognition in international bird conservation strategies. Given the rapid development of Maldivian islands, including deforestation, habitat modification, island reclamation, as well as spread and introduction of invasive species (Russell *et al*., 2024; Steibl *et al*., 2021), an archipelago-wide assessment of the Maldives avifauna is a timely, urgent, and relevant need.

2. Bird conservation and research in the Maldives

A total of 194 native bird species have been recorded in the Maldives, including rare vagrants, or at-sea records of seabirds within Maldivian waters (Anderson & Shimal, 2020). Bird species are considered as 'native' to the Maldives when they are either (1) breeding in the Maldives (e.g. different species of seabirds); (2) regular non-breeding visitors to the islands (e.g. different species of herons), to wetlands and beaches (e.g. waders), or to offshore waters (e.g. pelagic seabirds); or (3) irregular or rare vagrants that reached the Maldives accidentally – for example due to strong monsoon winds – and without human assistance (e.g. different species of passerines). Besides these, there occur human-introduced species in the Maldives, particularly on inhabited local or resort islands. Due to the popularity in bird pet-keeping, an increasing number of escaped introduced birds are locally occurring and sometimes establishing populations on islands. These include at least two species of weavers (*Ploceus* spp.), the House Sparrow (*Passer domesticus*), several parrot and parakeet species (e.g. Rose-ringed Parakeet *Psittacula krameri* or Cockatiel *Nymphicus hollandicus*), the Common Myna (*Acridotheres tristis*), and the Feral Pigeon (*Columba livia*). Of the 194 recorded native bird species to the Maldives, only 21 were previously confirmed to be breeding in the Maldives widely or regionally, frequently or irregularly (Anderson & Shimal, 2020). Most species records in the Maldives are thus migratory species, alluding to the importance of the Maldivian islands for migratory birds of the Central Asian Flyway (Steibl & Laforsch, 2021), as well as of the Maldives' productive offshore marine feeding grounds for Indian Ocean seabirds (Anderson & Shimal, 2020).

Internationally, the Maldives has received little attention and support to protect and restore their avian biodiversity. Only a single area has been designated as an Important Bird Area (IBA) by BirdLife International under A4i criteria (BirdLife International, 2025). This IBA is located in the northern-most atoll, Ihavandhippolhu, where thousands of Lesser Noddy (*Anous tenuirostris*) annually aggregate during the northeast monsoon (Iurvai; December to March). A tracking study confirmed that Lesser Noddies from as far as breeding colonies in the Seychelles (Cousine Island) move to the northern Maldives (Ali *et al*., 2023). The island of HA. Gallandhoo, which still maintains a largely intact *Pisonia* (Lhos gas; *Pisonia grandis*) broadleaf forest, is the major roosting site. Other than this single IBA, the Maldives holds three UNESCO biosphere reserves in Baa[1], Fuvahmulah[2], and Addu[3] atolls. All three are primarily recognised for marine biodiversity and conservation. Baa Atoll Biosphere Reserve includes only 1,040 ha of land area (*ca.* 0.7% of the total reserve area) and the Addu Biosphere Reserve includes only 1,472 ha of land area (*ca*. 9% of total reserve area). The Fuvahmulah Biosphere Reserve includes about 492 ha of terrestrial habitat (*ca.* 60% of total reserve area), most of which being wetlands.

Nationally, in 2015 103 species of bird were protected under the Environmental Protection and Preservation Act 4/93). In 2021, this protection was extended by the Ministry of Tourism and Environment giving a total of 207 bird species protected status through the Protected Species Regulation (2021R-25). A national regulation on migratory birds prohibits any activity that can harm seasonal migratory birds, which is particularly designed to counter the significant pressure that birds in the Maldives face from poaching for the pet-trade (Techera & Cannell-Lunn, 2019). Furthermore, of the total 93 nationally protected areas in the Maldives under EPA regulation, 38 are partly or fully protected landforms, including wetlands (‘kulhi’), mangrove areas (‘kandoofaa’), sandbanks (‘finolhuthah’), rocky banks (‘huraa gandu’) and vegetated islands[4]. Despite the formal protection of islands, wetlands, and sandbanks across the Maldives, enforcement of violations is challenging.

Scientific studies on birds in the Maldives are scarce and mainly focused on species records, accompanied by anecdotal observations on breeding or roosting, and other behavioural observations (Anderson & Shimal, 2020; Anderson, 2007; Anderson & Baldock, 2001; Anderson *et al*., 2016; Anderson *et al*., 2019; Ash & Shafeeg, 1994; Phillips, 1964). Recently, more systematic attempts have been made to document occurrence and temporal dynamics of migratory waders on one island (Lh. Naifaru) over a three-month period and in consecutive two years (Steibl & Laforsch, 2021), as well as conducting a repeated breeding nest census of a large, regionally significant

[1] https://www.unesco.org/en/mab/baa-atoll last accessed 28 January 2025.
[2] https://www.unesco.org/en/mab/fuvahmulah last accessed 28 January 2025.
[3] https://www.unesco.org/en/mab/addu-atoll last accessed 28 January 2025.
[4] https://protectedareas.environment.gov.mv/en/protected-areas last accessed 28 January 2025.

White-tailed Tropicbird (*Phaethon lepturus*) colony on one island (Lh. Kurehdhoo) (Russell *et al*., 2024). Only a single seabird tracking study has been conducted in the Maldives (Ali *et al*., 2023). However, GPS-tracking elsewhere in the Indian Ocean territories (e.g. Seychelles, Chagos, Réunion, Western Australia, and the Arabian Peninsula) has revealed that birds from breeding colonies at these locations migrate to Maldivian waters during non-breeding season (Trevail *et al*., 2023). A study by the Maldives Marine Research Centre interviewed tuna fishers across the Maldives and documented their heavy reliance on seabirds for locating fishing grounds (Jauharee & Adam, 2012). This short yet fairly comprehensive list of scientific studies testifies to the limited scientific understanding of bird biology in the Maldives, and the significant underrepresentation of the Maldives in Indian Ocean avian research, conservation and active restoration.

Therefore, this report aims to tackle a major knowledge gap for avian conservation in the Maldives. Through an interview process with knowledgeable and expert local community members across the Maldives, this report obtained, for the first time, atoll-level distribution data on the common breeding and migratory bird species in the Maldives.

3. Methods

The Ministry of Tourism and Environment have 207 bird species under national protection through the Protected Species Regulations (2021R-25). This list comprises bird species that are breeding, roosting, migrating, or overwintering in the Maldives either on the islands or in its offshore waters. To achieve a high-level understanding of the distribution and status of protected birds in the Maldives for downstream conservation and management action, we first conducted an internal short-listing of target species. Anderson and Shimal (2020) provided an overview on the status of each bird species in the Maldives based on breeding status, commonness, and abundance. Using these three criteria, and the 103 species of birds protected under the Environmental Protection and Preservation Act 4/93) we short-listed the list of protected birds in the Maldives to 29 species, focusing on breeding status, their distribution, and their commonness within the Maldives. The aim was to generate, for the first time, archipelago-wide, atoll-level data on the status of the common breeding residents and migratory species. We grouped protected birds in five major guilds (seabirds, herons and allies, waterbirds, waders, and land birds), and conducted a species short-listing within each guild. Of the 29 species short-listed for detailed status assessment, 13 belong to the seabird guild, 10 to the herons and allies guild, three to the waterbird guild, one to the wader guild, and two to the land bird guild.

Interviews were conducted with at least one local community member from each of Maldives' administrative atoll (and 20 of the 26 natural atolls). A total of 37 interviews

were conducted with a total of 42 participants, each of which held expert knowledge and/or traditional ecological knowledge on birds in their atoll, often also wider regional understanding. Letters detailing the study and interview process were first sent out to all 20 atoll councils to request assistance in identifying interview participants. Snowball sampling and purposive sampling were then utilised to identify knowledge-holders and experts on seabirds from each atoll. Efforts were made to cover the 26 natural atolls in the Maldives, and participants were identified from all but three single-island atolls (i.e. AA. Rasdhoo, K. Gaafaru, K. Kaashidhoo). The geographic atoll V. Vattaru is entirely uninhabited and rarely visited, so no information could have been obtained from there either. Interviews were initially conducted via videocalls, but differing levels of comfort with technology and internet access among participants meant that phone interviews proved to be a more accessible mode. During interviews, a slide deck of the short-listed bird species (Appendix 1) was sent to participants via Viber, and interviewees were guided through the images during the interview, confirming the names of birds, describing their plumage and size to minimise risk of misinterpretations. Date and time, as well as data on interviewee demographics (name, age, gender, home island, and occupation) were also recorded. Notably, the majority of the participants were tuna fishers, while the remainder of interviewees followed diverse professions including council staff, school staff, and protected-areas personnel.

Interviewees were presented with images of each short-listed bird species and asked about breeding or non-breeding occurrence, an order-of-magnitude population estimate (i.e. 1–10, 11–100, 101–1,000 or >1,000 birds), whether the species is widespread across the atoll or localised on a few islands within the atoll, and any anecdotal observations or traditional ecological knowledge on a given species in their atoll. When interviewees indicated a breeding population on the atoll, non-breeding occurrence was not also necessarily asked, but instead interviews were steered towards identifying and understanding breeding islands, population sizes, and population trends. In some instances, interviewees provided both breeding and non-breeding (roosting) islands of seabirds. For seabirds, we also asked whether birds are seen inside or outside the atoll lagoon, and whether they are only seen at sea or are also observed on islands. Taking into account the different regional and atoll dialects in the Dhivehi language, interviewees were also asked the species names for each bird in their respective atoll and dialect. As a final question to wrap up the interviews, all participants were asked about threats to bird species in the Maldives, and if there are any other commonly spotted bird species that were not covered by the interview. For each interview, a standardised spreadsheet that served as an interview guide (Appendix 2) was prepared in advance and filled out by the interviewers. Interviews were also fully recorded when consent was given by interviewees.

This standardised interview format provided atoll-level distribution data for 25 of the 29 short-listed species. The two species of frigatebird occurring in the Maldives are

recognised by the same Maldivian name (‘Hoara’) and are not recognised as separate species, so interviews yielded only genus-level information on Lesser/Greater Frigatebird (Hoara; *Fregata ariel/minor*) occurrence in the Maldives. Traditional ecological knowledge further considers Roseate Tern (Valla; *Sterna dougallii*) and Common Tern (Valla; *Sterna hirundo*) – the former a breeding resident, and the latter an overwintering visitor – to be the same species, with plumage and colour differences between the two species being instead considered as being breeding and non-breeding plumage of the same species. Both are also recognised under the same Dhivehi name (‘Valla’). The Black-crowned Night-heron (*Nycticorax nycticorax*) was summarised by Anderson and Shimal (2020) as a locally occurring, uncommon and tentatively breeding species in the Maldives, but interviewees failed to recognise this species reliably, so it was retrospectively excluded from downstream data summary and analysis. For the same reasons, the Indian Pond-heron (*Ardeola grayii*) was also retrospectively excluded.

After this core data collation phase, all interview spreadsheets were summarised and condensed (Appendix 3 and 4). Summary maps with atoll-level distribution information were created for each species using R 3.4.1 (R Core Team, 2021). We used geographical atolls (rather than administrative atolls) (Figure 1) as the unit of data summary, as the geographical atolls generally provide the more relevant unit for downstream management action (e.g. as operational units for restoration interventions). Population size estimates were only reliably and consistently provided for seabirds, so seabird maps (section 6.1) contain, where available, abundance estimate data from the interviewees, whereas maps for the other species guilds encode only presence or absence.

For an internal validation and review process, the resulting maps were then presented to 11 knowledgeable local bird experts from local communities across the Maldives as a step of data validation and reviewing. All participants of the internal validation were also interviewees in the main data collection process. The review was conducted via a Google Form, where participants assessed the maps and species data, rating them on a 1 to 5 scale (1: strong disagreement with the bird distribution map and data; 5: strong agreement with the bird distribution map and data). Participants were also encouraged to provide optional comments for additional insights or corrections, particularly if they identified errors or gaps in the data. The validation was analysed both quantitatively and qualitatively. Average scores of the disagreement-agreement scale were calculated for each species to assess the reliability of the data and categorised into three groups: ‘highly acceptable’ (mean score >4), ‘moderately acceptable’ (mean score 2–3.9), and ‘requiring further review’ (mean score <2). Anecdotal comments were examined to identify consistent patterns, gaps, or discrepancies. The overall average rating score of the distribution maps was 4.8 (‘highly acceptable’), suggesting a clear consensus among on the participants on the correctness of the data. All bird species received a highly acceptable mean score (>4) (Appendix 5).

In order to disseminate the findings of the study, a webinar was held, bringing together over 50 participants, including members of key government agencies and conservation organizations, as well as ornithologists, local knowledge holders, students, and other interested individuals. The webinar segments also focused on the relationship between birds and atoll ecosystems, as well as an overview of the legislation surrounding protected birds in the Maldives. The webinar has been fully recorded and is reposited at EPA Maldives, through which it can be accessed for future reference.

For creating species portfolios, Birds of the World (BOW, 2022) was used as the core reference. Indian Ocean-wide distribution of bird species, English and scientific names, and IUCN red-list status were also obtained from Birds of the World (BOW, 2022). The primary data reference for global population estimates for each bird species and population trends were also Birds of the World, but status assessment and global population data were cross-validated using BirdLife International species summary sheets (https://datazone.birdlife.org/). When neither were available in BirdLife nor Birds of the World, global population size estimates from Otero *et al*. (2018) were used. Bird taxonomy and phylogeny follows Birds of the World (BOW, 2022).

Because many island names are used repeatedly across different atolls, this report follows the general Maldivian convention of adding the formal one- or two-letter abbreviation of the respective administrative atoll division in which the island occurs (e.g. the island 'Hithaadhoo' in Gaafu Alifu atoll is written as 'GA. Hithaadhoo'). Island names follow the spelling as provided in OneMap, the authoritative source for the National map of the Maldives (https://onemap.mv/). To contextualise the findings for each short-listed species in the portfolio section with historic data, we used historic literature sources by Phillips (1964) and by Ash and Shafeeg (1994), which present the only two comprehensive summaries on birds of the Maldives from the 20th century.

4. Threats to birds in the Maldives

Birds in the Maldives face a variety of threats, which have been identified by the findings of this report, in combination with existing knowledge on key threats to island bird species from other archipelagos (Russell & Kueffer, 2019). Generally, island species are the most vulnerable and threatened biodiversity group of our planet: 87% of all recorded extinctions are island species, and 81% of all globally threatened species are found on islands (Doherty *et al*., 2016).

The largest threat for island birds are invasive species, which are responsible for 58% of all documented global vertebrate extinctions (Doherty *et al*., 2016). These

are primarily invasive mammal predators, which include several species of rats (*Rattus* spp.) and feral cats (*Catus felis*). In the Maldives, limited information on invasive mammal predators exists, but some mammals were probably introduced a long time ago (Russell *et al*., 2016). Recent efforts to map and identify key invasive species of conservation concern in the Maldives revealed that the Black Rat (*Rattus rattus*) is widely occurring throughout the Maldives, and has colonised inhabited islands, resort islands, as well as uninhabited islands, including some that are under EPA protection. Furthermore, populations of Brown Rat (*Rattus norvegicus*) and House Mouse (*Mus musculus*) exist at least locally on some urbanised islands (Russell & Steibl, unpublished). These invasive mammalian predators are known for their devastating impacts on island biodiversity, including birds but also sea turtle nesting, lizards, insects, and plants (Harper & Bunbury, 2015). The Asian House Shrew (*Suncus murinus*) also occurs widely throughout the Maldives, and has infested local islands, resort islands, as well as uninhabited islands, including some that are under EPA protection. However, less is known about the impacts of this introduced species widespread in the Indian Ocean, although as well as certainly having impacts on invertebrates, it potentially also impacts birds (Barbehenn, 1962). Some islands in the Maldives remain uninvaded by introduced mammals, but with continued development of islands, increased movement and shipping within and between atolls, and overall higher mobility of locals and international travellers, further spread of invasive predators to predator-free islands is likely to prevail. Additionally, many widespread invasive species of conservation concern, such as the Fire Ant (*Solenopsis invicta*), have not yet arrived in the Maldives, but without public biosecurity awareness, effective rules, and active enforcement, can be expected to establish eventually.

Another key threat to birds in the Maldives is the rapid development of the islands themselves. This became particularly apparent through the interviews with local community members that were conducted for this report. Interviewees recalled repeatedly that major seabird breeding or roosting islands were developed as resorts, reclaimed by urban development, or destroyed through sand-mining activities. Additionally, interviewees stated that frequent and unregulated visits of sandbanks by tourists and locals disrupts breeding behaviour and has resulted in the abandonment of seabird breeding islands. These assertions by local community members align closely with research findings from other archipelagos, where unregulated, unsupervised, and nature-unconscious visits to sandbanks and uninhabited islands resulted in significant decline and disappearance of seabird colonies (Berr *et al*., 2023). Deforestation of inhabited islands for development, often involving the clearance of all vegetation (Steibl *et al*., 2021), has also been linked to the decline and disappearance of birds from islands. According to interviewees, even inhabited islands formerly harboured small numbers of breeding seabirds, such as White-tailed Tropicbirds (Dhandifulhu dhooni; *Phaethon lepturus*) in large Banyan Trees (Nika gas; *Ficus prolixa*), but these birds disappeared when trees were cut during development or land reclamation. A particularly alarming example for the

rapid and ongoing disappearance of birds in the Maldives are the interview findings on the status of the Crab-plover (Theyravaa; *Dromas ardeola*). This unique wader species was consistently reported by most interviewees as highly abundant (hundreds of birds) across the Maldives in the past, but almost entirely ceased to occur in the last 20–30 years. This interview result aligns closely with old records from the Maldives, such as Phillips (1964) and Ash and Shafeeg (1994), which reported the Crab-plover as 'common and widespread' and speculated about breeding populations in the Maldives. The Crab-plover's popularity and occurrence in Maldivian folklore and music (e.g. the popular song 'Theyravaa') underlines its former commonness and stands as a stark example for how the disappearance of birdlife from the Maldives not only impacts biological but also cultural diversity through the loss of a unique element of Maldivian culture, which shares a deep interrelationship and connection with many native bird species through storytelling, idioms, music and folklore.

The third major threat to birds in the Maldives comes from the popularity of keeping birds as pets (Ash & Shafeeg, 1994). Even though illegal under EPA regulation (Environmental Protection and Preservation Act 4/93), bird poaching is still widely practiced across the Maldives. Interviewees confirmed that in the past thousands of seabird eggs and chicks were harvested from single islands, sometimes clearing entire breeding colonies. Migratory birds, as well as resident land birds, are also caught and either kept or sold. This harvesting of breeding seabirds must have contributed significantly to the decline and disappearance of many breeding colonies throughout the Maldives. Today, seabirds are still sold and traded, creating additional pressure on the remaining colonies.

Other potential threats to birdlife in the Maldives arise particularly from the shifting focus towards exotic birds for pet-keeping, a practice that at least partially may have reduced the pressure on the native birds. However, with the largely uncontrolled import of exotic birds from India, Southeast Asia, and Africa, the risk that major bird pathogens eventually arrive to the Maldives is increasing. Avian malaria, Highly Pathogenic Avian Influenza (HPAI), and other key bird diseases that are known to have caused the decline or extinction of island bird species (Bennett *et al*., 2024; Shehata *et al*., 2001), have not yet arrived in the Maldives. Furthermore, there are risks that the import and trade of exotic bird species known to behave highly invasively on islands, including Common Myna (*Acridotheres tristis*), may result in species escapes and establishment. Subsequently, this can negatively impact native resident bird populations through competition and predation (Evans, 2021).

5. Knowledge gaps and further monitoring and research needed

The outcomes of this report identified several major knowledge gaps and research needs for targeted bird conservation and restoration actions in the Maldives.

5.1. Validating breeding status on islands and the occurrence of rare species

The interviews that were conducted with knowledgeable and expert community members from local islands across the Maldives identified islands where seabirds are still breeding and/or roosting today. This list of islands now requires ground-truthing by a dedicated survey expedition to confirm or update the occurrence of seabird breeding and population sizes, to inform future legal protection status. The names of islands that were given by interviewees are listed in the portfolios for each species. Localised breeding of several rare species (including Yellow Bittern *Botaurus sinensis*, Cinnamon Bittern *Botaurus cinnamomeus*, Black-Winged Kite *Elanus caeruleus*, and others) was identified through the interviews. Validating the breeding occurrence of these species in the Maldives is another important next step towards the active protection of remnant bird populations.

5.2. Developing protocols for long-term, standardised monitoring of common breeding and non-breeding birds

The qualitative and anecdotal observations from interviewees recognised an overall rapid decline and disappearance of breeding birds in the Maldives over the past decades, particularly seabirds. However, to date no standardised data collection protocol exists that enables a long-term monitoring and quantification of breeding and non-breeding bird populations' demographic trends in the Maldives. This constitutes a major gap for Maldives bird conservation, with no robust empirical data to support policy- and decision-makers in their efforts to counter the apparent decline and disappearance of avian biodiversity from the Maldives. Despite anecdotal reports on the apparent drivers behind bird decline (see section 'Threats to Birds in the Maldives'), no empirical assessment and quantification of different impacts and their relative importance exists to date, creating a major gap for identifying and prioritising the most urgent conservation and restoration actions. Specific bird reporting and monitoring protocols need to be developed to generate robust and reliable data on Maldivian bird status, trends, and drivers of decline.

For monitoring demography and trends of bird populations, bird-ringing is a powerful method, yet the Maldives currently lack any formal guidelines, schemes, or regulations on bird ringing. Developing a scheme for ringing birds, and well as training and licensing people to ring birds is a key step towards more comprehensive and standardised bird research in the Maldives. A dedicated programme to re-train bird poachers into bird-ringers for conservation and research thereby offers an opportunity to leverage the existing knowledge on handling and catching birds on remote islands, while also involving and engaging poachers in new, sustainable forms of interacting with birds.

5.3. Identifying pathways and opportunities for active restoration of seabird breeding colonies

Despite the absence of empirical data to underpin evaluation of the relative contribution of different impacts to the general seabird decline in the Maldives, several key issues have been clearly identified by this and earlier assessments (e.g. Anderson & Shimal, 2020; Ash & Shafeeg, 1994) and are known from other island ecosystems as major drivers for island biodiversity loss (Berr *et al*., 2023; Russell & Kueffer, 2019). To halt and reverse the decline of seabirds in the Maldives, it is therefore urgent and essential to identify pathways and opportunities for active restoration with different stakeholders (e.g. government, community groups, national and international NGOs, resorts) in the Maldives.

One major driver for seabird decline on islands globally are invasive mammal predators, particularly rats (*Rattus* spp.). Entirely removing rats from islands (‘rat eradication’ or ‘de-ratting’) is an established island conservation tool, with over 1,000 successful de-ratting operations on islands worldwide (Spatz *et al*., 2022). Given the small size of Maldivian islands, eradicating invasive rats is a highly feasible restoration intervention on all islands, and promises major benefits for seabirds and other island biodiversity (Russell & Holmes, 2015). Building local capacity to establish rat-eradication operations as an ecological restoration technique that can be led by Maldivian organisations and island communities is key. De-ratting operations promise significant and persistent benefits to seabirds, particularly for uninhabited islands, as well as EPA-protected islands that have historically housed large seabird colonies and are infested by invasive rats, such as B. Olhugiri, B. Mendhoo, or HA. Gallandhoo islands (Steibl, unpublished).

The second key threat for seabirds in the Maldives is the high disturbance frequency or complete loss of breeding islands. Many seabird species in the Maldives nest seasonally and for no more than 10–12 weeks per year, so temporarily closing important sandbanks and islands for tourism and local-community use may be a feasible opportunity to protect colonies when strictly enforced. A key knowledge gap towards this management intervention is a lack of empirical data on seabird breeding

phenology in the Maldives. Understanding when seabird breeding is occurring is a relevant next research need to be able to temporarily close access to sandbanks and islands. To counter the loss of suitable habitat, another key management intervention that has not been evaluated in the Maldives is the use of nest rafts (or floating nest platforms), particularly for ground-nesting terns. The use of nest rafts as artificial breeding habitat is a well-established and effective tool in active seabird restoration worldwide (Dunlop *et al*., 1991). Terns in the Maldives rapidly and temporarily colonise reclaimed land during resort construction phases and commence breeding, so it is likely that they will utilise dedicated artificial raft structures. These also provide protection from invasive predators, are not impacted by coastal erosion, and are not under pressure from urban or tourism development. A thorough assessment on suitable raft setup, locations, distance from shore, and management need to accompany such a pilot programme. Another dimension to habitat conservation would be to establish regulations by which island development has to maintain a given percentage of island forested with native atoll vegetation, that can provide important refugia for breeding seabirds, even on densely developed resort islands (Russell *et al*., 2024).

5.4. Evaluating taxonomic status of five Maldivian breeding birds

There exist at least five tentatively endemic taxa of birds to the Maldives, the Maldivian White-breasted Waterhen (*Amaurornis phoenicurus maldivus*), the Southern Maldivian Striated Heron (*Butorides striata albidula*), the Northern Maldivian Striated Heron (*Butorides striata didii*), the Maldivian Pond-heron (*Ardeola grayii phillipsi*) and the Maldivian House Crow (*Corvus splendens maledivicus*) (Anderson & Shimal, 2020). None of these described endemic taxa have been phylogenetically validated for their tentative endemism-status, leaving a knowledge gap in species-centred bird conservation to the Maldives. Many species-centred conservation funds are based on IUCN Red-List criteria and endemism-status, so evaluating the uniqueness of these bird lineages has the potential to unlock access to major conservation funds for conservation organisations. Furthermore, understanding to what extent these (and other) bird taxa in the Maldives constitute distinct lineages is relevant to understand whether active bird translocations are a feasible bird restoration technique for the Maldives, or risk to dilute the genetic diversity of Maldives bird biodiversity.

5.5. Understanding the role and relevance of birds in Maldivian culture and their social and economic value

Through the interviews with local community members, particularly elders and tuna fishers, it became readily evident that birds play an important role in Maldivian culture and practices. Seabird occurrence and breeding phenology has been repeatedly linked to specific nakaiy (i.e. the traditional Maldivian holistic calendar system), and different seabird species are used as indicators for different commercially valuable fish species, as well as overall indicators for the quality of fishing. Birds (both seabirds and land birds) play an integral part in Maldivian culture and folklore. Even though the ongoing poaching of birds for pets is far from sustainable, it nevertheless testifies that birds are valued by island communities and these communities have experienced bird knowledge-holders. With the decline and disappearance of birds from the Maldives, much of the traditional and local knowledge around birds is also threatened to disappear within the next generation. Documenting the rich cultural knowledge around birds and their interrelationship with other parts of the Maldivian cultural heritage, such as their traditional fishing culture, is urgent and relevant (Smith *et al*., 2021; Thomson *et al*., 2023). By documenting and presenting the role of seabirds to Maldivian communities, it can contribute to raising awareness on the importance of active bird conservation and restoration, not just as a means of biodiversity conservation but also to preserving parts of a unique island cultural heritage.

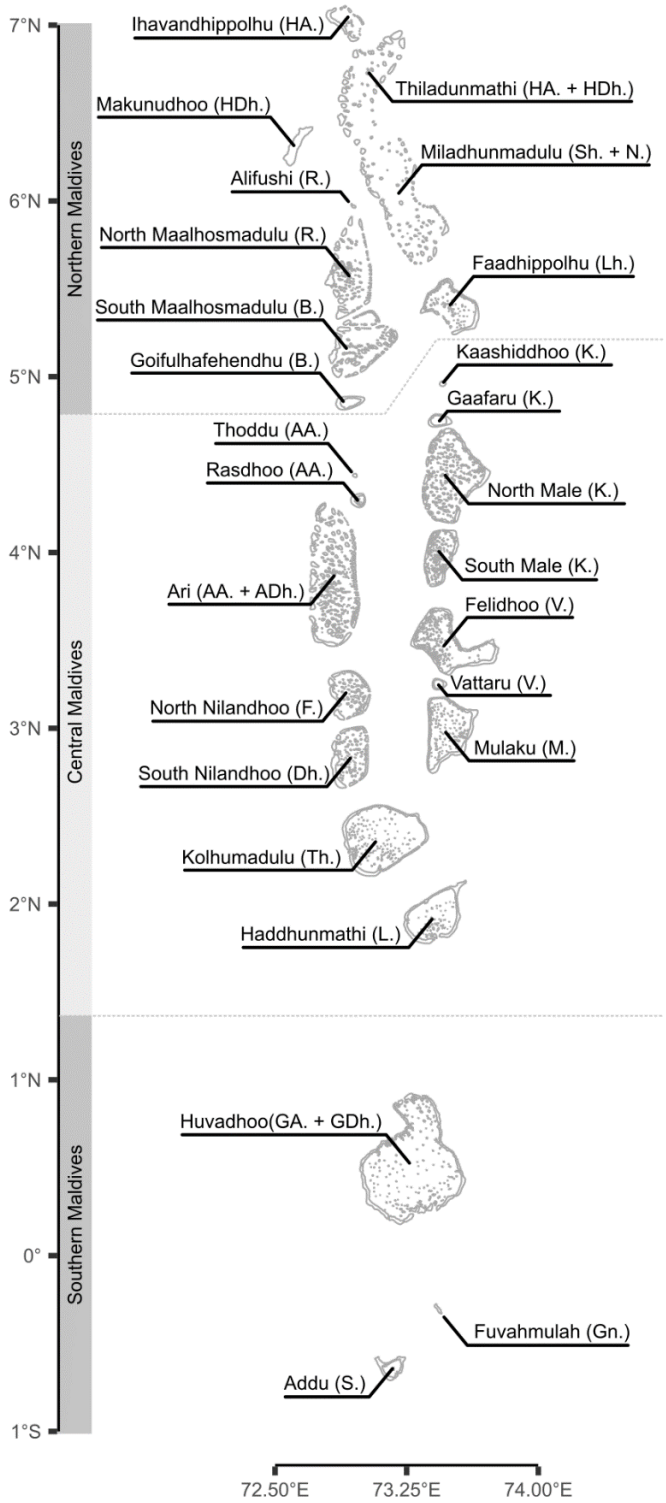


Figure 1: Map of the Maldives. Name of each natural atoll and the corresponding one- or two-letter abbreviation code of the administrative atoll division(s) in brackets. Thiladunmathi and Miladhunmadulu are technically forming a single natural atoll but were treated as two atolls (i.e. the northern Thiladunmathi group and the southern Miladhunmadulu group) in this report. Atoll names followed by ‡ – symbol indicates those that were not covered by the interview survey process.

6. Status of birds in the Maldives

6.1. Seabirds

6.1.1. Overview

Seabirds ('Ainmathee dhooni' in Dhivehi, translating roughly to 'birds above schooling fish') are a group of species that predominantly forage at sea and return to land only for breeding and roosting. In the Maldives, the seabird guild comprises terns and gulls (Laridae), shearwaters and petrels (Procellariiformes), frigatebirds (Fregatidae), boobies (Sulidae), and tropicbirds (Phaethontidae).

A total of 31 species of seabirds are protected under EPA regulation in the Maldives (Table 1). Of these, eight breed in the Maldives, while the other 22 only migrate seasonally or infrequently to the Maldives during their non-breeding season, albeit at least some of these species may have historically bred in the Maldives.

Eight seabird species are considered to be widespread throughout the Maldives, four occur only localised in some atolls, one only occurs in the Southern atolls of Huvadhoo and Addu, and nine occur exclusively in offshore Maldivian waters but are not known to occur on islands and inside atoll lagoons. Anderson and Shimal (2020) list 13 species as common in the Maldives, eight as uncommon, five as rarely occurring, and another five only occurring as vagrants in the Maldives.

Table 1: Seabird species status in the Maldives. Status in the Maldives based on Anderson and Shimal (2020). Green cells indicate where birds met the shortlisting criteria, and detailed species-level assessment data was obtained by interviews. Based on a short-listing by breeding status, distribution, and occurrence within the Maldives, a detailed assessment of 13 seabird species in the Maldives was conducted through the interview process. LC = Least Concern, NT = Near Threatened.

English name	Dhivehi name	IUCN status	Breeding status	Distribution status	Occurrence status
Brown Noddy	Maaranga	LC	Yes	Widespread	Common
Black-naped Tern	Kiru dhooni	LC	Yes	Widespread	Common
Great Crested Tern	Bodu gaadhooni	LC	Yes	Widespread	Common
White-tailed Tropicbird	Dhandifulhu dhooni	LC	Yes	Widespread	Common
Roseate Tern	Valla	LC	Yes	Widespread	Uncommon
Saunders's Tern	Bondhu dhooni	LC	Yes	Localised	Common

English name	Dhivehi name	IUCN status	Breeding status	Distribution status	Occurrence status
Tropical Shearwater	Dhivehi hoagulha	LC	Yes	Localised	Uncommon
White Tern	Dhondheeni	LC	Yes	South	Uncommon
Lesser Noddy	Kurangi	LC	No	Widespread	Common
Common Tern	Vaali	LC	No	Widespread	Common
Lesser Crested Tern	Ainmathee gaadhooni	LC	No	Widespread	Common
Lesser Frigatebird	Hoara	LC	No	Localised	Uncommon
Great Frigatebird	Maa hoara	LC	No	Localised	Uncommon
Flesh-footed Shearwater	Maa hoagulha	NT	No	Offshore	Common
Bridled Tern	Vaali	LC	No	Offshore	Common
Sooty Tern	Beyndhu	LC	No	Offshore	Common
Wilson's Storm-petrel	Kandu kabaa	LC	No	Offshore	Common
Wedge-tailed Shearwater	Bondu hoagulha	LC	No	Offshore	Common
Masked Booby	Hudhu maadhooni	LC	No	Offshore	Uncommon
Brown Booby	Kalhu maadhooni	LC	No	Offshore	Uncommon
Red-footed Booby	Rathafai maadhooni	LC	No	Offshore	Uncommon
Streaked Shearwater	Hoagulha	NT	No	Offshore	Rare
Gull-billed Tern	Kanifulhu dhooni	LC	No	?	Rare
Caspian Tern	Miyaremu dhooni	LC	No	?	Rare
Caspian Gull	Gohorukey	LC	No	?	Rare
Lesser Black-backed Gull	Gohorukey	LC	No	?	Rare
Whiskered Tern	?	LC	No	?	Vagrant
Brown-headed Gull	Gohorukey	LC	No	?	Vagrant
Black-headed Gull	Boakalhu gohorukey	LC	No	?	Vagrant
Pallas's Gull	Gohorukey	LC	No	?	Vagrant
White-eyed Gull	Loahudhu gohorukey	LC	No	?	Vagrant

6.1.2. Ecological background

6.1.2.1. Breeding and non-breeding habitat of seabirds

During the breeding season, seabirds gather in colonies on islands or coastal areas (Coulson, 2001). These breeding sites are usually remote and protected from predators, such as isolated islands, rocky cliffs, or sandy beaches. Such locations provide minimal disturbance for their eggs and chicks. Seabirds typically nest in large colonies, which offers further protection against predators and makes it easier to find mates (Coulson, 2001). Some species nest on the ground, while others build nests in trees, or breed in burrows underground.

Outside of the breeding season, seabirds shift their focus to foraging and the majority of species spend most of their time at sea (Schreiber & Burger, 2001). During the non-breeding season, seabirds feed in diverse areas, including offshore waters, coastal zones, continental shelves, oceanic fronts, estuaries, lagoons, mangroves, and intertidal flats (Shealer, 2001). Some seabirds travel thousands of kilometres to follow ocean currents and upwelling zones, where cold, nutrient-rich water attracts fish and plankton (Bost *et al*., 2009). Their ability to glide effortlessly over waves and dive into the water helps them thrive in this environment.

6.1.2.2. Migration patterns and timing of seabirds

Seabirds are known for their extensive migration patterns, which often involve long-distance travel across vast oceanic regions (Schreiber, 2001). Unlike many land birds, their migrations are less tied to seasonal changes and more influenced by food availability, breeding cycles, and ocean currents (Phillips *et al*., 2017).

During the breeding season, seabirds return to their nesting colonies. These migrations often coincide with periods of high food availability near their breeding grounds, ensuring they can provide for their chicks. For example, many seabirds in the Indian Ocean time their migrations to coincide with monsoon-driven upwellings, which increase the abundance of fish and squid (Trevail *et al*., 2023).

Once the breeding season ends, most species disperse widely across the open ocean. However, some, like the Sooty Tern (*Onychoprion fuscatus*), may remain near their breeding colonies, while others, such as Wedge-tailed Shearwaters (*Ardenna pacifica*), embark on extensive migrations across entire ocean basins (Catry *et al*., 2009). Seabirds often follow oceanic features like currents, upwelling zones, or convergence areas where food is concentrated.

Not all seabirds migrate in the same way. Some species, like frigatebirds, remain highly mobile year-round, soaring effortlessly over vast distances in search of food (Weimerskirch *et al*., 2006). Others, like certain species of boobies, may exhibit more localized movements. These patterns allow seabirds to exploit the dynamic nature of

the ocean and survive in an environment where food resources are constantly shifting.

6.1.2.3. Diet of seabirds

Seabirds have diverse diets that are closely tied to the marine environment. Their food mainly consists of fish, squid, and other small marine animals, which they catch in different ways depending on the species (Shealer, 2001). Some species groups are surface feeders, skimming the water to grab prey near the surface (Shealer, 2001). For example, frigatebirds and some tern species snatch flying fish or squid while flying just above the waves (Weimerskirch *et al*., 2010). Furthermore, frigatebirds also steal fish from other seabird species, a behaviour known as klepto-parasitism (Vickery & Brooke, 1994).

Other species groups, such as boobies, dive for prey. They plunge from the air into the water, to target fish swimming up 5-metres deep (Zavalaga *et al*., 2007). Some, like shearwaters, use a combination of diving and underwater swimming to pursue prey, often catching schooling fish or krill in deeper waters (Young & Ballance, 2023).

Seabirds are also opportunistic feeders, meaning they adapt their diet based on what is available (Young & Ballance, 2023). Some species often follow fishing boats to scavenge discarded fish or rely on seasonal abundance in specific areas, such as fish spawning events or ocean upwelling zones where nutrients attract large schools of fish (Young & Ballance, 2023).

6.1.2.4. Seabird monitoring methods

A variety of methods exist to monitor seabird populations (Burger & Lawrence, 2000; Walsh *et al*., 1995). One common method is observing seabird colonies during the breeding season (Walsh *et al*., 1995). Systematic nest, egg, and/or chick counts can be conducted to estimate population sizes and measure breeding success (Saunier *et al*., 2024). This helps determine if a population is stable, increasing, or decreasing. Because seabirds are long-lived species, changes in adult breeding bird population sizes due to environmental changes often have a substantial time lag (Walsh *et al*., 1995). Monitoring breeding success, instead, is a more rapid and sensitive way to detect deteriorating environmental conditions, such as food shortages (Walsh *et al*., 1995).

Another key technique is ringing (also termed ‘banding’ in some countries) individual birds (Walsh *et al*., 1995). Small metal or plastic rings with unique codes and/or colour combinations are attached to the bird’s legs, allowing the tracking of site fidelity and survival when the birds are re-sighted or recaptured (Peach *et al*., 1999). Advanced tracking devices like geolocators and GPS loggers have more recently become popular (Bernard *et al*., 2021). These devices are attached to the bird’s

body or leg and record movement information including where they migrate, how far they fly, and the areas they use for foraging. The spatial and temporal accuracy of these tracking devices is highly variable, with GLS loggers only providing kilometre-scale resolution, whereas expensive GPS transmitters can give metre-scale accuracy (Phillips *et al*., 2004).

Cameras can be deployed for nest monitoring. These can capture footage of seabird behaviour without disturbing the birds, providing insights into chick feeding patterns, chick development, and predator threats (Bird *et al*., 2022). Large colonies can be monitored using drones to survey and count nests from the air, especially in remote or hard-to-reach locations (Edney *et al*., 2023; Edney & Wood, 2021). To monitor at-sea foraging behaviour, cameras can also be directly attached to larger seabird species, such as boobies or frigatebirds (Clark *et al*., 2022; Edney & Wood, 2021).

Other methods include studying seabird diet by analysing regurgitated food or collecting blood and feathers to study pollutants and stress hormones (Barrett *et al*., 2007).

6.1.2.5. Threats

Seabirds face threats both on land and at sea. Introduced predators, such as rats (*Rattus* spp.), house mice (*Mus musculus*) and feral cats (*Felis catus*), can cause major land-based impact as they can prey on eggs, chicks and adults, and disturb nesting (Dias *et al*., 2019). Many seabirds have not evolved defensive responses to such land predators (Warham, 1996), as they are generally relatively recent introductions to their breeding islands (Mack *et al*., 2000). Another major land-based threat is habitat loss and human disturbance (Phillips *et al*., 2023). Many seabirds nest on remote islands, which are increasingly being disturbed by human activities including tourism, construction, and sandmining (Duffy & Peschko, 2023). Poaching of seabirds for eggs, chicks, or even adults can also impact their populations (Mondreti *et al*., 2018).

Pollution can be another threat depending on location. Oil spills contaminate the water and can coat seabirds' feathers, making it difficult for them to insulate and find food (Gilmour *et al*., 2023). Additionally, chemical pollution from industries can poison the fish that seabirds rely on and accumulate in their tissue (Gilmour *et al*., 2023).

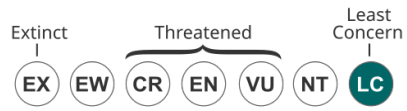
A key ocean-based threat is overfishing, as it reduces the availability of fish and other marine animals that seabirds need to survive (Phillips *et al*., 2023). Some seabirds, like boobies and petrels, are also accidentally entangled in fishing lines or nets, a problem known as bycatch (Phillips *et al*., 2023). Climate change also affects seabirds by altering ocean temperatures and currents, which disrupts food availability and breeding success, or by creating extreme weather events that can

cause the destruction of island breeding colonies (Dias *et al*., 2019; Oswald & Arnold, 2012).

Finally, diseases can spread quickly in crowded seabird colonies, further threatening populations. Highly Pathogenic Avian Influenza (HPAI) has severely impacted seabird colonies around the world (McPhail *et al*., 2025; Tremlett *et al*.).

6.1.3. White Tern (Dhondheeni; *Gygis alba*)

IUCN status: Least Concern



Global population estimate: 350,000 birds
Global population trend: INCREASING

Table 2: Distribution of White Tern (Dhondheeni; *Gygis alba*) in the Maldives.
Status: b = breeding; b? = breeding suspected; nb = non-breeding; - = absent/vagrant. Population: + = 1–10; ++ = 11–100; +++ = 101–1,000; ++++ = > 1,000 birds estimated; ? = no estimate. If breeding is occurring, no information on non-breeding status and population sizes is provided.

Area	Natural atoll	Administrative atoll	Status	Population
North	Ihavandhippolhu	HA.	-	-
	Thiladunmathi	HA. + HDh.	-	-
	Makunudhoo	HDh.	-	-
	Miladhunmadulu	Sh. + N.	-	-
	North Maalhosmadulu	R.	-	-
	South Maalhosmadulu	B.	-	-
	Goifulhafehendhu	B.	-	-
	Faadhippolhu	Lh.	-	-
Central	Thoddu	AA.	-	-
	Ari	AA. + ADh.	-	-
	South Male	K.	-	-
	Felidhoo	V.	-	-
	North Nilandhoo	F.	-	-
	South Nilandhoo	Dh.	-	-
	Mulaku	M.	-	-
	Kolhumadulu	Th.	-	-
	Haddhunmathi	L.	-	-
South	Huvadhoo	GA. + GDh.	b	+++
	Fuvahmulah	Gn.	nb	+
	Addu	S.	b	+++

6.1.3.1. Situation in the Maldives

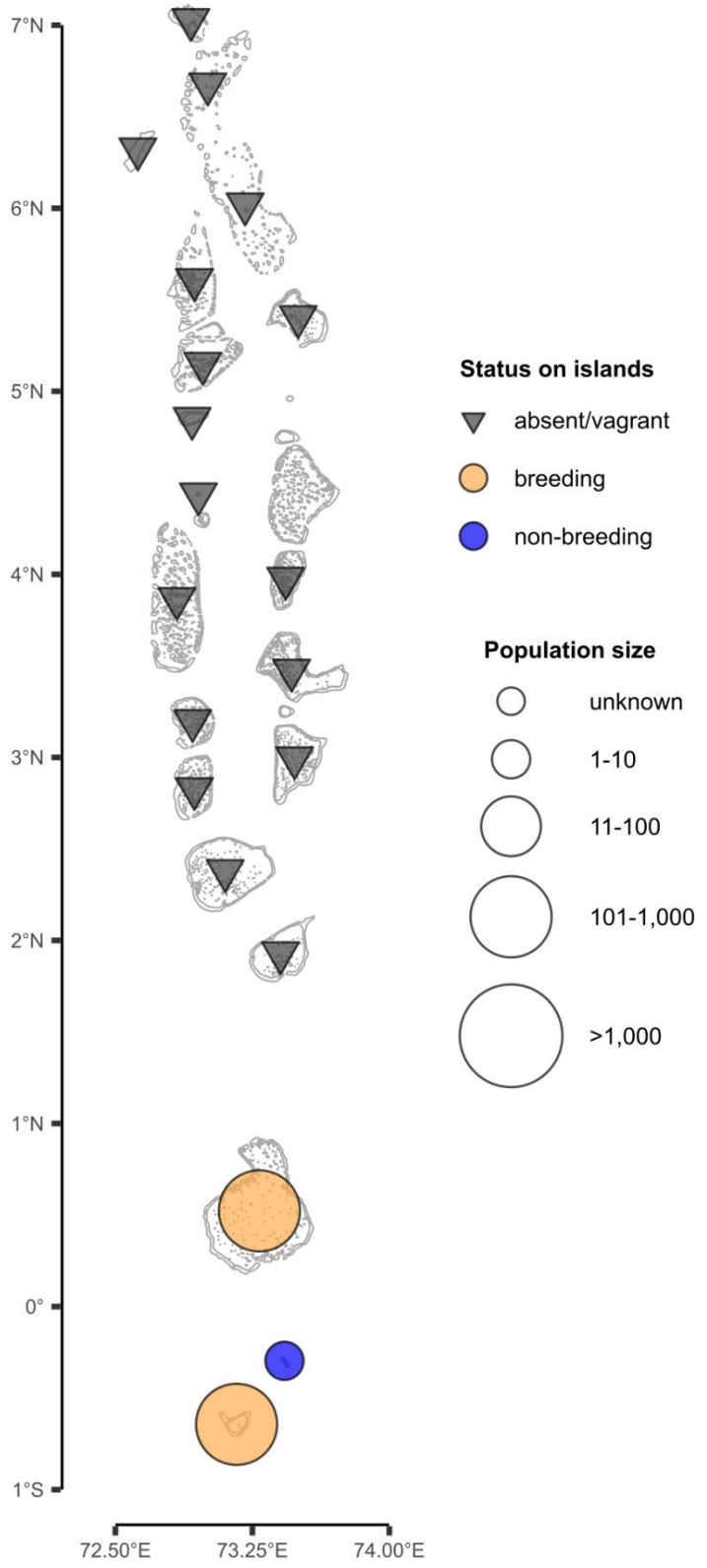
The White Tern (*Gygis alba*) is confined in its breeding range to the southern atolls of Addu and Huvadhoo (Figure 2). Allegedly, locals translocated the White Tern from Addu to GDh. Havodigalaa (Huvadhoo atoll) in the 1990s, where a breeding population established and recently began colonising neighbouring islands, including the inhabited GDh. Madaveli and GDh. Thinadhoo. The White Tern is known to nest in Mango trees (Anbu; *Mangifera indica*) and Breadfruit trees (Ban-bukeyo; *Artocarpus altilis*). The deforestation and cutting of trees for urban development in Addu atoll is considered to be one driver for their recent decline in the atoll, particularly on S. Gan and S. Feydhoo. The recently established House Crow (*Corvus splendens*) population on Addu atoll is considered another major threat for White Terns, with interviewees reporting observing crows disturb breeding White Terns and killing their chicks.

Outside their known breeding sites in the southern atolls, White Terns are regularly observed at sea around Fuvahmulah atoll (and were also seen roosting in the Fuvahmulah Nature Park area in 2024) and also infrequently observed at sea by fishers in the southern parts of Haddhunmathi atoll. Further north, single records exist of White Terns from Kaashiddhoo atoll, and on HA. Medhafushi in Ihavandhippolhu atoll (Anderson, 2007).

Phillips (1964) reported the White Tern to be confined to Addu atoll, where it was breeding in large numbers. Ash and Shafeeg (1994) report that the White Tern established in Addu atoll only in the 20th century, where it commonly breeds year-round, and mention that first records were made from Fuvahmulah atoll in November 1993.

6.1.3.2. Atoll-level summary

Northern Maldives
Ihavandhippolhu: not observed.
Thiladunmathi: not observed.
Makunudhoo: not observed.
Miladhunmadulu: not observed.
North Maalhosmadulu: not observed.
South Maalhosmadulu: not observed.
Goifulhafehendhu: not observed.
Faadhippolhu: not observed.



Central Maldives
Thoddu: not observed.
Ari: not observed.
South Male: not observed.
Felidhoo: not observed.
North Nilandhoo: not observed.
South Nilandhoo: not observed.
Mulaku: not observed.
Kolhumadulu: not observed.
Haddhunmathi: very rarely seen at sea in southern parts of the atoll.

Southern Maldives
Huvadhoo: breeding on GA. Hithaadhoo, GDh. Havodigalaa, GDh. Madaveli, GDh. Thinadhoo, and tentatively also on a few other islands neighbouring GDh. Havodigalaa, estimated 100–200 birds. Also observed on GA. Dhevvaamaagalaa but not known to nest there.
Fuvahmulah: commonly seen at sea, estimated 50 birds. Rarely also on the island in Fuvahmulah Nature Park area, estimated 1–2 birds roosting.
Addu: breeding throughout the atoll, estimated 500 birds. Formerly more abundant.

Figure 2: Distribution of White Tern (Dhondheeni; *Gygis alba*) in the Maldives. When breeding is occurring on an atoll, no information on roosting is provided. If only roosting is indicated, it means that no breeding is known to occur in the atoll.

6.1.3.3. Indian Ocean distribution

Breeding distribution:

Aldabra atoll, Providence, Amirante, Tromelin, Agalega, Seychelles, Mascarene Islands, Chagos, Cocos-Keeling atoll, southern atoll of the Maldives (Niethammer & Patrick, 2020) (Figure 3).

Non-breeding distribution: Considered to remain close to nearby breeding areas (Niethammer & Patrick, 2020).

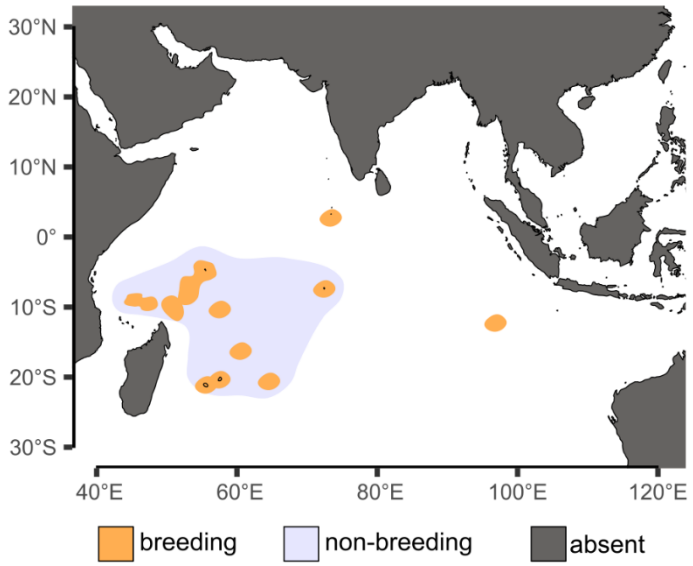


Figure 3: Indian Ocean-wide distribution map of White Tern (Dhondheeni; *Gygis alba*).

6.1.3.4. Breeding biology

Average clutch	Incubation	Fledge	Nest	Diet
1 egg	33–41 d	31–67 d	Tree branches, rarely coral rocks	Fish, squid

Timing: No pronounced seasonality in breeding known. Adults, eggs, and chicks can be found at most breeding sites in all months of the year but local peaks in breeding activity known (Niethammer & Patrick, 2020). Local prey availability is probably a major driver in determining breeding timing (Niethammer & Patrick, 2020). Aride Island, Seychelles: breeding peaks December to May (Niethammer & Patrick, 2020). Ascension Island, St Helena, Ascension and Tristan da Cunha, UK: breeding concentrated November to March, peaking in January (Dorward, 1963). Chagos: breeding May to August (Niethammer & Patrick, 2020).

Nest site: Nesting predominantly on branches of trees in forested areas of islands or in mangroves, but occasionally also on small coral rocks (Ely & Clapp, 1973), or deserted nests from Noddies (Gallagher, 1960). Egg balanced in forks or shallow depressions in bark, up to 18 m above ground, no nest built (Miles, 1986). High site fidelity, with about 75% of birds re-laying at same nest site and on subsequent years on Tern Island, Seychelles (Niethammer & Patrick, 2020). On Ascension Island, 81% of breeding pairs nested in the same spot in two consecutive seasons (Dorward, 1963).

Clutch size: 1 egg per clutch. Re-laying observed after loss of egg or chick (Niethammer & Patrick, 2020).

Incubation period: 35–36 days on Midway atoll (Howell, 1978), 33–41 days on Tern Island, Seychelles (Niethammer *et al*., 1992), 33–37 days on Johnston atoll (Niethammer & Patrick, 2020).

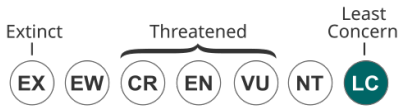
Fledging: 31–67 days after hatching at Tern Island, Seychelles (Niethammer & Patrick, 2020). Mean fledging period 53 days at French Frigate Shoals atoll (Pettit & Whittow, 1983).

Breeding success: Hatching success (the proportion of eggs hatched relative to eggs laid) 37.6% and fledging success (the proportion of chicks fledged relative to eggs hatched) 79.8% at Tern Island, Seychelles (Niethammer & Patrick, 2020). 88% hatching success and 80% fledging success at O'ahu Island, Hawai'i (Miles, 1986). 41.6% hatching success and 70.3% fledging success at Ascension Island (Dorward, 1963). 64% hatching success and 62% fledging success at Cousine Island, Seychelles (Malan *et al*., 2009).

Breeding cycle and interval: First breeding observed in birds at age 5 (Niethammer & Patrick, 2020). Nests at least annually, but some pairs can successfully rear 2–3 broods per year (Niethammer & Patrick, 2020).

6.1.4. Brown Noddy (Maaranga; *Anous stolidus*)

IUCN status: Least Concern



Global population estimate: 800,000–14,000,000 birds
Global population trend: STABLE

Table 3: Distribution of Brown Noddy (Maaranga; *Anous stolidus*) in the Maldives
Status: b = breeding; b? = breeding suspected; nb = non-breeding; - = absent/vagrant. Population: + = 1–10; ++ = 11–100; +++ = 101–1,000; ++++ = > 1,000 birds estimated; ? = no estimate. If breeding is occurring, no information on non-breeding status and population sizes is provided.

Area	Natural atoll	Administrative atoll	Status	Population
North	Ihavandhippolhu	HA.	nb	++++
	Thiladunmathi	HA. + HDh.	nb	++++
	Makunudhoo	HDh.	nb	++++
	Miladhunmadulu	Sh. + N.	nb	+++
	North Maalhosmadulu	R.	nb	+++
	South Maalhosmadulu	B.	nb	++
	Goifulhafehendhu	B.	nb	+++
	Faadhippolhu	Lh.	nb	+++
Central	Thoddu	AA.	-	-
	Ari	AA. + ADh.	nb	+++
	South Male	K.	nb	+++
	Felidhoo	V.	-	-
	North Nilandhoo	F.	nb	+++
	South Nilandhoo	Dh.	-	-
	Mulaku	M.	nb	+++
	Kolhumadulu	Th.	nb	+++
	Haddhunmathi	L.	-	-
South	Huvadhoo	GA. + GDh.	b	?
	Fuvahmulah	Gn.	-	-
	Addu	S.	nb	++++

6.1.4.1. Situation in the Maldives

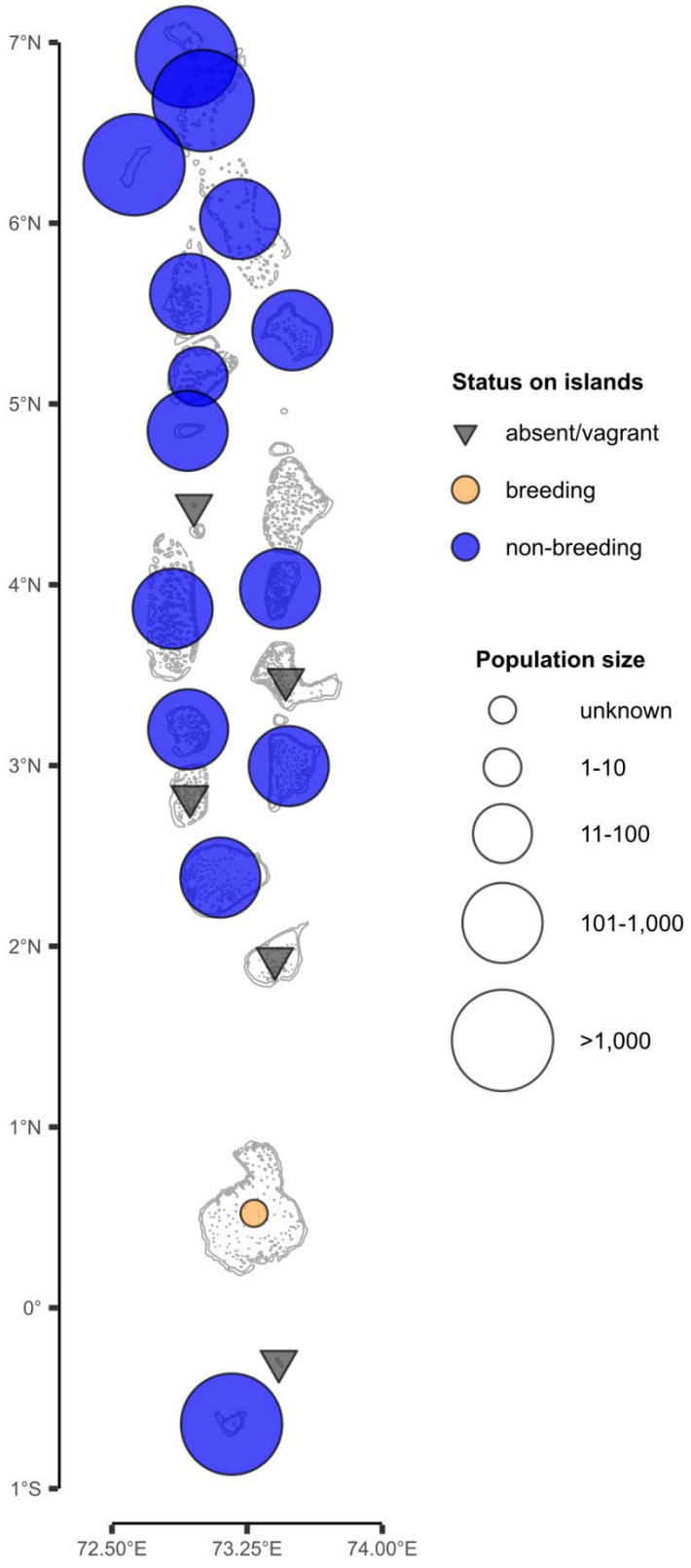
The Brown Noddy (*Anous stolidus*) is a widespread and common species (Figure 4), regularly observed both at sea and roosting on undisturbed sandbanks. Some interviewees indicated historical breeding of Brown Noddy in the Maldives, detailing even the type of tree (Boshi gas; *Heliotropium arboreum*) in which it nested and the nakaiy in which egg-laying took place (Atha and Hitha, i.e. between 21 September and 17 October). Nowadays, the Brown Noddy is a mostly migratory species (but is still breeding in Huvadhoo atoll), arriving at the beginning of the northeast monsoon season (Iruvai; December to March). Traditional ecological knowledge generally links the occurrence of Brown Noddies to high fishing season. Brown Noddies usually aggregate together with Lesser Noddies and Roseate Terns on small rocky banks ('huraa gandu') and sandbanks ('finolhuthah') for roosting.

Phillips (1964) recorded the Brown Noddy to be breeding in very low numbers in Addu atoll but otherwise referred to it as a non-breeding resident in large numbers. Ash and Shafeeg (1994) mentioned only one confirmed record of Brown Noddy breeding in the Maldives but considered it otherwise a common non-breeding resident in large numbers throughout the year.

6.1.4.2. Atoll-level summary

Northern Maldives
Ihavandhippolhu: large numbers (>5,000 birds) observed during Iruvai season on HA. Gallandhoo, apparently in the past also breeding on this island. Roosting on rocky banks.
Thiladunmathi: roosting on sandbanks, estimated over 1,000 birds. Formerly also breeding on rocky banks.
Makunudhoo: roosting on sandbanks, estimated over 1,000 birds.
Miladhunmadulu: Sh. Naalaahuraa important roosting island, estimated 200–300 birds.
North Maalhosmadulu: widely roosting, estimated 100–1,000 birds.
South Maalhosmadulu: widely roosting, estimated 50 birds.
Goifulhafehendhu: widely roosting, estimated several 100 birds. Formerly more abundant.
Faadhippolhu: widely roosting, estimated 500–600, sometimes over 1,000 birds.

Central Maldives
Thoddu: only in small numbers (2–3 birds) seen at sea inside the lagoon, but not on land.
Ari: mainly seen at sea outside the lagoon, estimated 50–300 birds, roosting on rocky sandbanks. Formerly breeding on ADh. Kalhahan'dhihuraa but breeding ceased in the 2000s.
South Male: mainly seen at sea inside and outside the lagoon, but sometimes also roosting, estimated 100–300 birds.



Felidhoo: only observed at sea inside and outside the lagoon, several hundred birds.
North Nilandhoo: roosting on F. Bandidhuffushi-finolhu, estimated 200–500 birds.
South Nilandhoo: only observed at sea inside and outside the lagoon.
Mulaku: commonly observed at sea and roosting on islands, estimated up to 400 birds.
Kolhumadulu: roosting on sandbanks, estimated over 100 birds.
Haddhunmathi: only rarely observed at sea outside the lagoon, estimated 10–200 birds. L. Bodufinolhu may be a roosting island but status uncertain.

Southern Maldives
Huvadhoo: breeding in northern parts (GA.) of atoll on GA. Hithaadhoo and also in southern parts (GDh.). Generally, abundantly roosting on islands in the atoll, incl. GA. Dhevvalaabadhoo, estimated over 1,000 birds.
Fuvahmulah: only observed at sea, fewer than 50 birds estimated.
Addu: roosting on S. Kan'dihera gan'du, S. Mulikede, estimated 2,000–3,000 birds. Historically also breeding on S. Kan'dihera gan'du.

Figure 4: Distribution of Brown Noddy (Maaranga; *Anous stolidus*) in the Maldives. When breeding is occurring on an atoll, no information on roosting is provided. If only roosting is indicated, it means that no breeding is known to occur in the atoll.

6.1.4.3. Indian Ocean distribution

Breeding distribution:

Breeds in the Red Sea (incl. Socotra), Seychelles, Lakshadweep, Chagos, Western Australia, Christmas Island, Cocos-Keeling, Indonesia, a recent colony discovered in Sri Lanka, off the coast of Tanzania, Mauritius, and Mascarene Islands (Chardine *et al*., 2020) (Figure 5).

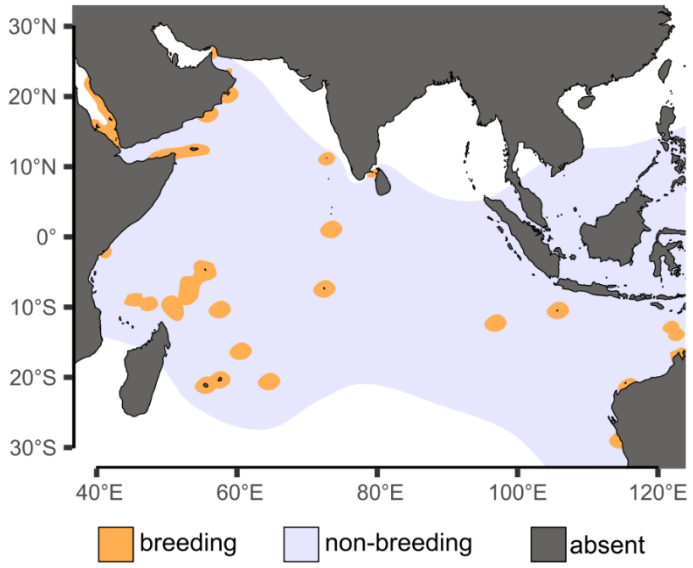


Figure 5: Indian Ocean-wide distribution map of Brown Noddy (Maaranga; *Anous stolidus*).

Non-breeding distribution:

Rarely strays out of warm (sub-) tropical waters and usually stays within 100 km of colonies even outside breeding season but sometimes seen far offshore. Returns to land for roosting during non-breeding season, particularly at night (Chardine *et al*., 2020).

6.1.4.4. Breeding biology

Average clutch	Incubation	Fledge	Nest	Diet
1 egg	30–41 d	38–46 d	Ground, branches, vegetation	Small fish, squid

Timing: Nocturnal attendance at the colony commences about two weeks before the first eggs are laid. In Indian ocean colonies, eggs are found in most months with relatively short periods of breeding inactivity (Gibson-Hill, 1951; Harris, 1969; Schreiber & Ashmole, 1970; Serventy *et al*., 1971). Lakshadweep: breeding primarily in February (Chardine *et al*., 2020). Tanzania and Kenya: breeding June to October (Chardine *et al*., 2020). Aldabra and Cosmoledo atolls: breeding September to March, with peak egg-laying December to January (Mlodinow *et al*., 2025). Christmas Island: breeding April to November (Gibson-Hill, 1947). Cocos-Keeling atoll: breeding December to June (Gibson-Hill, 1947). Chagos: the exact timing of breeding is unknown (Carr, 2015), but there are potentially two breeding seasons in May to August and December to February (Pocklington *et al*., 1972). Serpent Island, Mauritius: breeding October to November (Pocklington *et al*., 1972).

Nest site: Breeds on a wide variety of isolated and usually small oceanic islands. Breeding habitat is variable: on rock shelf, bare shingle, sand, shrubs, base of coconut palm fronds, and *Pandanus* trees (Chardine *et al*., 2020).

Clutch size: Typically, one egg per clutch and one clutch per season, but a relatively high proportion of females re-lay if an egg or chick is lost, even after loss of a chick at an advanced age. Average time to re-laying after loss of egg/chick is 12–35 days (Morris & Chardine, 1992). Between 1–2% of nests with two eggs are assumed to be artefactual and the result of laying by two females (Brown, 1975) or accidental re-laying (Brown, 1975; Diamond & Prŷs-Jones, 1986).

Incubation period: Incubation periods vary from 30–40 days, but the mean incubation period across locations is consistently ca. 34–36 days (Mlodinow *et al*., 2025). Manana Island, Hawai'i: 34.6–37.5 days (Brown, 1977). Kure atoll: 34–40 days (Woodward, 1972). French Frigate Shoals atoll: 30–37 days. Johnston atoll: 30–41 days (Amerson Jr & Shelton, 1976). Christmas Island: 33–35 days (Gibson-Hill, 1951).

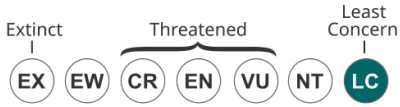
Fledging: Manana Island, Hawai'i: 38–46 days (Brown, 1977). Kure atoll: 40–45 days (Woodward, 1972). Parents continue feeding of fledglings at least 100 days after first flight (Brown, 1976).

Breeding success: In Caribbean colonies, the hatching success (the proportion of eggs hatched relative to eggs laid) is between 72–97%. In the same colonies, fledging success (the proportion of chicks fledged relative to eggs hatched) is between 68–94% (Morris & Chardine, 1992). On Aldabra atoll, breeding success is low or nil due to predation by Pied Crows (*Corvus albus*) (Diamond & Prŷs-Jones, 1986). On Manana, Hawai'i, hatching success of 50% and fledging success at 33% (Brown, 1973). Mean total breeding success on islands in Central Pacific of 0.16 chicks per pair on Manana Island (Brown, 1973), 0.43–0.57 chicks per pair on Kure atoll (Woodward, 1972), and 0.38 chicks per pair on Johnston atoll (Amerson Jr & Shelton, 1976).

Breeding cycle and interval: Duration of immature stage is 3–7 years. Breeding interval ca. 1 year (Mlodinow *et al*., 2025).

6.1.5. Lesser Noddy (Kurangi; *Anous tenuirostris*)

IUCN status: Least Concern



Global population estimate: 1,200,000 birds
Global population trend: STABLE

Table 4: Distribution of Lesser Noddy (Kurangi; *Anous tenuirostris*) in the Maldives. Status: b = breeding; b? = breeding suspected; nb = non-breeding; - = absent/vagrant. Population: + = 1–10; ++ = 11–100; +++ = 101–1,000; ++++ = > 1,000 birds estimated; ? = no estimate. If breeding is occurring, no information on non-breeding status and population sizes is provided.

Area	Natural atoll	Administrative atoll	Status	Population
North	Ihavandhippolhu	HA.	nb	++++
	Thiladunmathi	HA. + HDh.	nb	++++
	Makunudhoo	HDh.	nb	++++
	Miladhunmadulu	Sh. + N.	nb	+++
	North Maalhosmadulu	R.	nb	++++
	South Maalhosmadulu	B.	b?	?
	Goifulhafehendhu	B.	nb	+++
	Faadhippolhu	Lh.	nb	+++
Central	Thoddu	AA.	-	-
	Ari	AA. + ADh.	nb	+++
	South Male	K.	nb	+++
	Felidhoo	V.	nb	+++
	North Nilandhoo	F.	nb	+++
	South Nilandhoo	Dh.	-	-
	Mulaku	M.	nb	+++
	Kolhumadulu	Th.	nb	+++
	Haddhunmathi	L.	nb	++
South	Huvadhoo	GA. + GDh.	b	?
	Fuvahmulah	Gn.	-	-
	Addu	S.	nb	+++

6.1.5.1. Situation in the Maldives

The Lesser Noddy is one of the most common seabirds in the Maldives, albeit not breeding in large numbers (Figure 6). Breeding of Lesser Noddy is apparently still occurring in Huvadhoo atoll, where traditional ecological knowledge links the start of its breeding period to Atha and Hitha nakaiy (21 September to 17 October). Formerly, the Lesser Noddy was also known to breed in Addu and South Maalhosmadulu atolls.

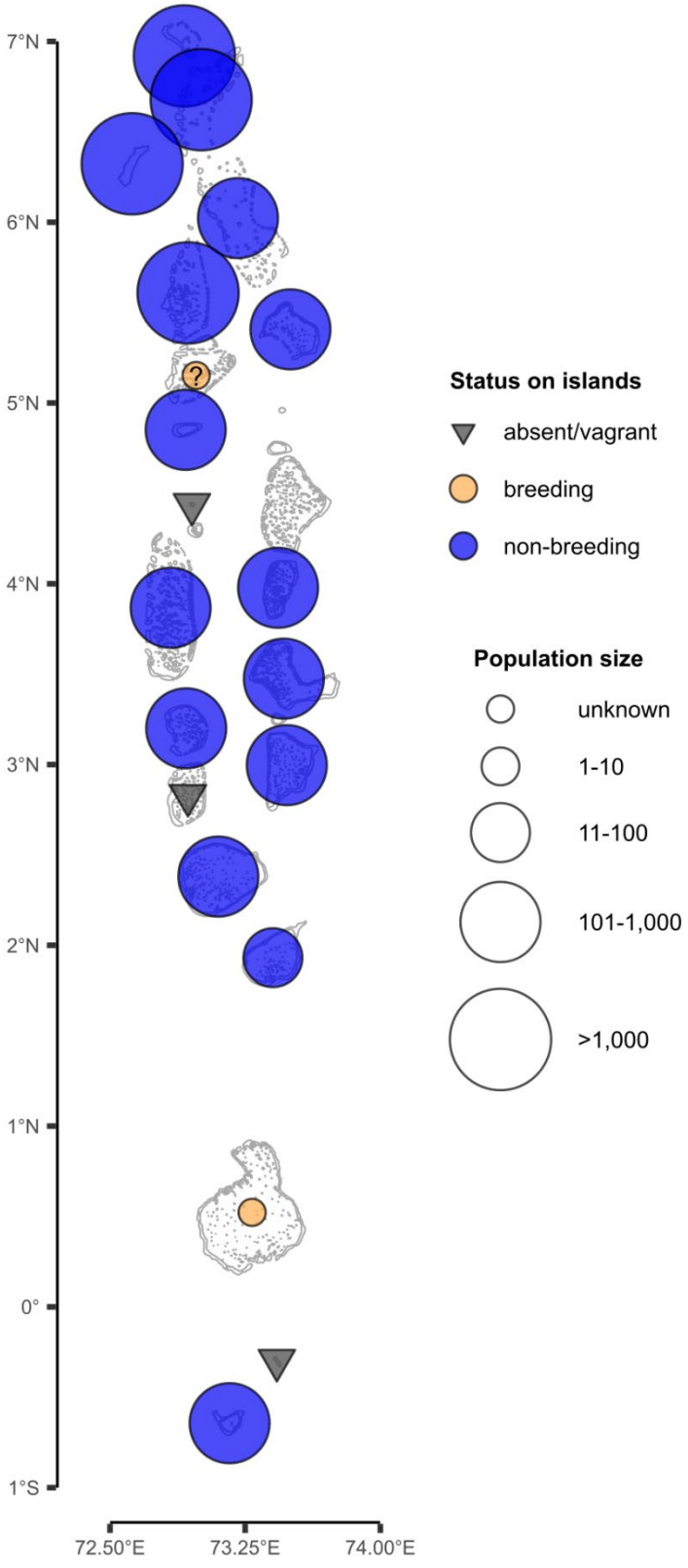
Nowadays, Lesser Noddy is a mostly migratory species in the Maldives, particularly during the northeast monsoon season (Iruvai), when many thousand birds migrate to the Maldives. One tracking study found a Lesser Noddy migrating from Cousine Island, Seychelles, to HA. Gallandhoo in Ihavandhippolhu atoll, covering 2,400 km in eight days (Ali *et al*., 2023). The arrival and presence of Lesser Noddy is strongly linked to good fishing conditions, and fishers strongly rely on Lesser Noddy to locate tuna fishing grounds (Jauharee & Adam, 2012). Lesser Noddies are also commonly poached for pets, with one interviewee stating prices of 200 MVR (ca. US$13) per bird.

Phillips (1964) mentioned a historic record of Lesser Noddy breeding in South Maalhosmadulu from November 1899. Ash and Shafeeg (1994) reported Lesser Noddy as widespread throughout the Maldives although in lower numbers than Brown Noddy, while also emphasizing that Lesser Noddy were likely overlooked due to similarity with Brown Noddy.

6.1.5.2. Atoll-level summary

Northern Maldives
Ihavandhippolhu: major roosting island is HA. Gallandhoo, estimated 1,000 – 2,000 birds.
Thiladunmathi: roosting, estimated over 1,000 birds.
Makunudhoo: roosting on sandbanks (‘finolhuthah’), estimated over 1,000 birds.
Miladhunmadulu: roosting on Sh. Naalaahuraa, otherwise mostly observed at sea outside the lagoon, estimated 200–400 birds.
North Maalhosmadulu: roosting on sandbanks (‘finolhuthah’), estimated over 1,000 birds.
South Maalhosmadulu: tentatively breeding on an island near B. Thulhaadhoo, otherwise commonly observed roosting on sandbanks (‘finolhuthah’), estimated 50–100 birds.
Goifulhafehendhu: roosting, estimated over 100 birds.
Faadhippolhu: roosting, up to 1,000 birds.

Central Maldives
Thoddu: potentially present, but interviewee not confident about difference between Brown Noddy and Lesser Noddy.



Ari: roosting on rocky banks ('gaahuraa'), sandbanks ('finolhuthah') and on ADh. Kalhahan'dhihuraa, estimated 50–300 birds. Formerly also breeding.
South Male: roosting on sandbanks ('finolhuthah'), estimated over 100 birds.
Felidhoo: roosting, estimated over 100 birds.
North Nilandhoo: roosting on sandbanks ('finolhuthah') incl. F. Bandidhuhfinolhu, estimated 200–500 birds.
South Nilandhoo: only at sea inside and outside the lagoon, estimated up to 1,000–2,000 birds.
Mulaku: roosting on rocky banks ('gaahuraa') and on M. Seedheehuraa, estimated over 400 birds.
Kolhumadulu: roosting on sandbanks ('finolhuthah'), estimated over 100 birds.
Haddhunmathi: roosting on L. Vadinolhu, estimated up to 100 birds.

Southern Maldives
Huvadhoo: breeding on GA. Dhevvalaabadhoo, GA. Hithaadhoo, and GA. Hinaamaagalaa.
Fuvahmulah: only at sea.
Addu: roosting on S. Kan'dihera gan'du and S. Mulikede, estimated several hundred birds. Formerly also breeding on S. Kan'dihera gan'du.

Figure 6: Distribution of Lesser Noddy (Kurangi; *Anous tenuirostris*) in the Maldives. When breeding is occurring on an atoll, no information on roosting is provided. If only roosting is indicated, it means that no breeding is known to occur in the atoll.

6.1.5.3. Indian Ocean distribution

Breeding distribution:

In Seychelles, Mascarene Islands, St Brandon Island (N of Mauritius), Chagos, off Western Australia (Gochfeld *et al*., 2020b; Safford & Hawkins, 2013) (Figure 7).

Non-breeding distribution:

Largely unknown. Non-breeding birds visit Arabia, Madagascar, the Tanzanian coast, rarely also Sri Lanka and Bay of Bengal. Birds arrive on the Tanzanian coast usually January to March. Birds from Western Australia do not to migrate and remain during non-breeding season in waters around their breeding colonies (Surman *et al*., 2018). Large numbers of birds along entire west coast of India July to August (Raju *et al*., 2024).

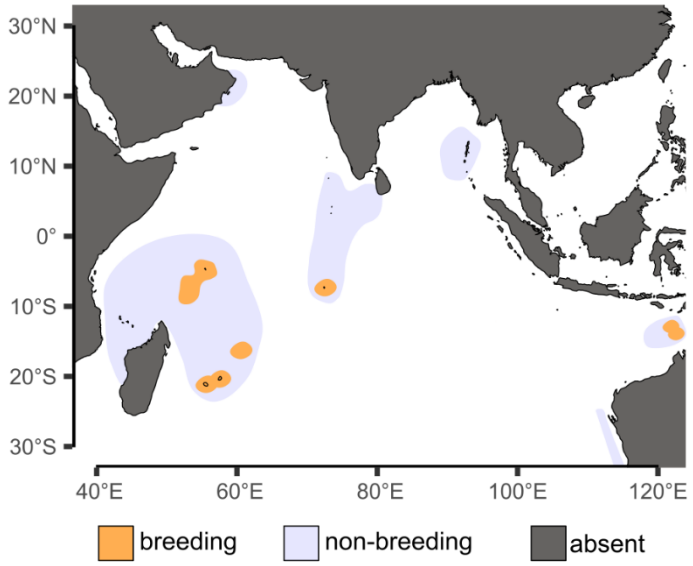


Figure 7: Indian Ocean-wide distribution map of Lesser Noddy (Kurangi; *Anous tenuirostris*).

6.1.5.4. Breeding biology

Average clutch	Incubation	Fledge	Nest	Diet
1 egg	34 d	40 d	Exclusively in vegetation	Small fish, invertebrates

Timing: Aride Island, Seychelles: breeding May to June (Ramos *et al*., 2004). Houtman Abrolhos Islands, Western Australia: breeding August to December (Surman & Wooller, 1995).

Nest site: In tall trees (predominantly Pisonia [Lhos gas; *Pisonia grandis*]) and occasionally also low bushes on Cousin and Aride islands, Seychelles. Also, in mangrove trees (Surman *et al*., 2018).

Clutch size: One egg per clutch (Gochfeld *et al*., 2020b).

Incubation period: Mean incubation period 34 days (Surman & Wooller, 1995).

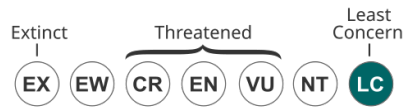
Fledging: Fledging on average 40 days after hatching (Surman & Wooller, 1995).

Breeding success: On Houtman Abrolhos Islands, Western Australia, hatching success 60% (Surman & Wooller, 1995). On Aride Island, Seychelles, 66–90% hatching success, but in one year only 28% when a severe rainstorm dislodged many nests (Ramos *et al*., 2004).

Breeding cycle and interval: Information not available/known.

6.1.6. Saunders's Tern (Bondhu dhooni; *Sternula saundersi*)

IUCN status: Least Concern



Global population estimate: 26,700 birds
Global population trend: DECREASING

Table 5: Distribution of Saunders's Tern (Bondhu dhooni; *Sternula saundersi*) in the Maldives. Status: b = breeding; b? = breeding suspected; nb = non-breeding; - = absent/vagrant. Population: + = 1–10; ++ = 11–100; +++ = 101–1,000; ++++ = > 1,000 birds estimated; ? = no estimate. If breeding is occurring, no information on non-breeding status and population sizes is provided.

Area	Natural atoll	Administrative atoll	Status	Population
North	Ihavandhippolhu	HA.	-	-
	Thiladunmathi	HA. + HDh.	nb	+
	Makunudhoo	HDh.	nb	+
	Miladhunmadulu	Sh. + N.	nb	++
	North Maalhosmadulu	R.	-	-
	South Maalhosmadulu	B.	nb	?
	Goifulhafehendhu	B.	-	-
	Faadhippolhu	Lh.	-	-
Central	Thoddu	AA.	-	-
	Ari	AA. + ADh.	-	-
	South Male	K.	nb	++
	Felidhoo	V.	-	-
	North Nilandhoo	F.	nb	?
	South Nilandhoo	Dh.	-	-
	Mulaku	M.	b	+
	Kolhumadulu	Th.	nb	?
	Haddhunmathi	L.	-	-
South	Huvadhoo	GA. + GDh.	nb	++
	Fuvahmulah	Gn.	-	-
	Addu	S.	-	-

6.1.6.1. Situation in the Maldives

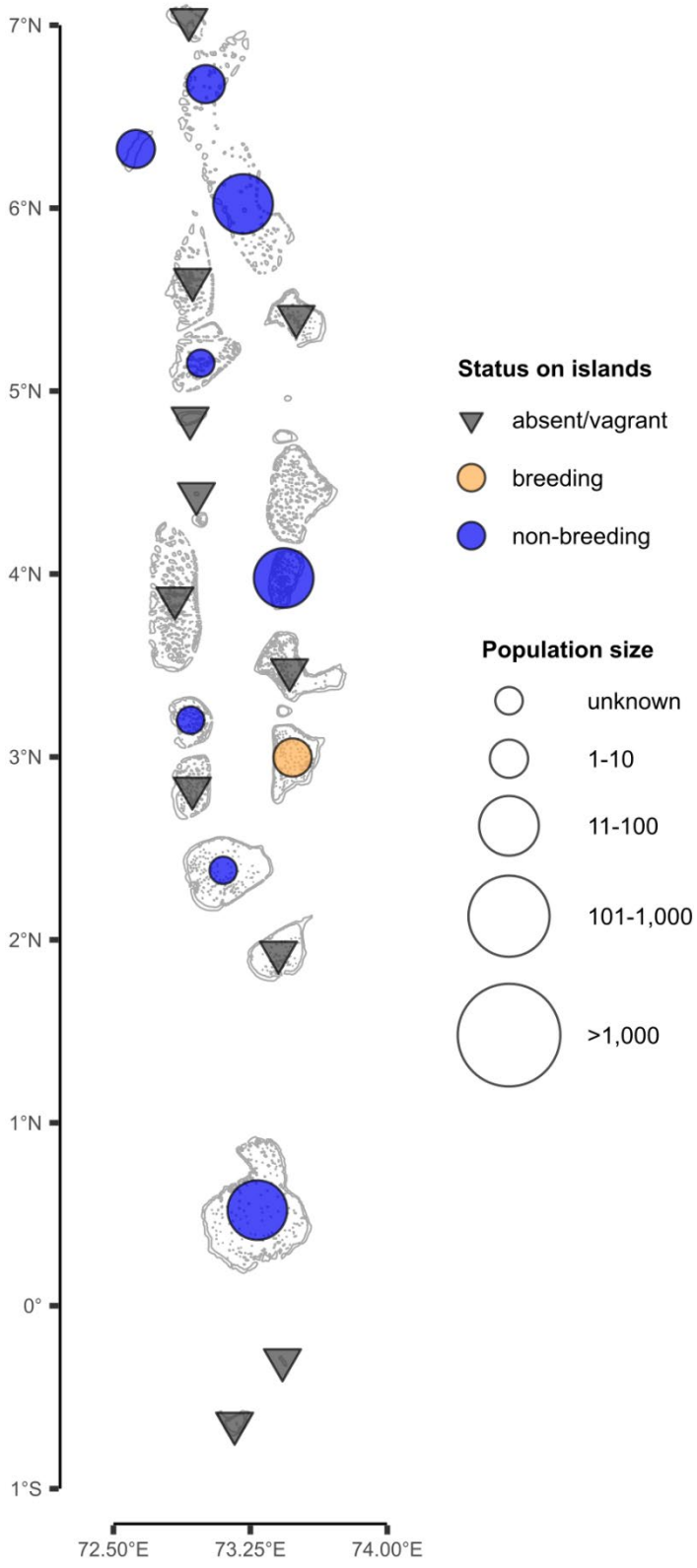
The Saunders's Tern (*Sternula saundersi*) is only infrequently observed (Figure 8) and usually seen in low numbers among other tern species. In the northern atolls, its occurrence is linked to good bait-fish presence during the northeast monsoon ('Iruvai'). One interviewee stated that the Saunders's Tern is more common in the Central Maldives, particularly around North Male atoll (Kaafu).

Phillips (1964) reported breeding of Saunders's Tern throughout the Maldives and stated observations in very large numbers throughout the year. Ash and Shafeeg (1994) reported Saunders's Tern as a numerous resident throughout the Maldives.

6.1.6.2. Atoll-level summary

Northern Maldives
Ihavandhippolhu: only observed at sea outside the lagoon during Iruvai.
Thiladunmathi: occasionally observed roosting in small numbers in HDh. Kulhudhuffushi wetland ('kulhi'), estimated 10 birds.
Makunudhoo: infrequently roosting on sandbanks ('finolhuthah'), no more than 10 birds. Observed at sea in small numbers during good bait-fish presence.
Miladhunmadulu: mostly observed at sea, but sometimes roosting on sandbanks in southern part (N.) of the atoll, estimated 50–100 birds although numbers are variable.
North Maalhosmadulu: not observed.
South Maalhosmadulu: observed roosting on sandbanks.
Goifulhafehendhu: not observed.
Faadhippolhu: not observed.

Central Maldives
Thoddu: not observed.
Ari: only at sea inside the lagoon, estimated 20–30 birds at a time over schooling fish, sometimes up to 100 birds.
South Male: roosting on sandbanks ('finolhuthah') and reclaimed areas, estimated 30–40 birds. at sea outside the lagoon, estimated 20–30 birds at a time.
Felidhoo: only at sea outside the lagoon, estimated 10–20 birds at a time.
North Nilandhoo: roosting on sandbanks ('finolhuthah'), estimated 200 birds at sea over schooling fish. Not observed in 10 years as per another account.
South Nilandhoo: only at sea inside the lagoon.
Mulaku: breeding in very small (≤10) numbers on rocky banks ('gaa huraa'). At sea observed estimated 50 birds.
Kolhumadulu: occasionally observed roosting among Black-naped Terns (*Sterna sumatrana*) and Roseate Terns on uninhabited islands.
Haddhunmathi: not observed.



Southern Maldives
Huvadhoo: roosting on sandspits (‘thundi’) in northern parts (GA.) of atoll, estimated 20–30 birds. At sea inside the lagoon across the entire atoll. Formerly more abundant.
Fuvahmulah: not observed.
Addu: not observed.

Figure 8: Distribution of Saunders’s Tern (Bondhu dhooni; *Sternula saundersi*) in the Maldives. When breeding is occurring on an atoll, no information on roosting is provided. If only roosting is indicated, it means that no breeding is known to occur in the atoll.

6.1.6.3. Indian Ocean distribution

Breeding distribution:

Red Sea, Socotra, Southern Somalia, off Saudia Arabia and Oman, along the coast of the Persian Gulf, Sri Lanka, possibly also in Seychelles (Gochfeld *et al*., 2020e) (Figure 9).

Non-breeding distribution: Largely unknown. Considered to overwinter from Red Sea to Tanzania, Madagascar and east to India. Probably also in Seychelles during non-breeding season. Also an uncommon non-breeding visitor to Thailand, Malay Peninsula, and Strait of Malacca (Gochfeld *et al*., 2020e).

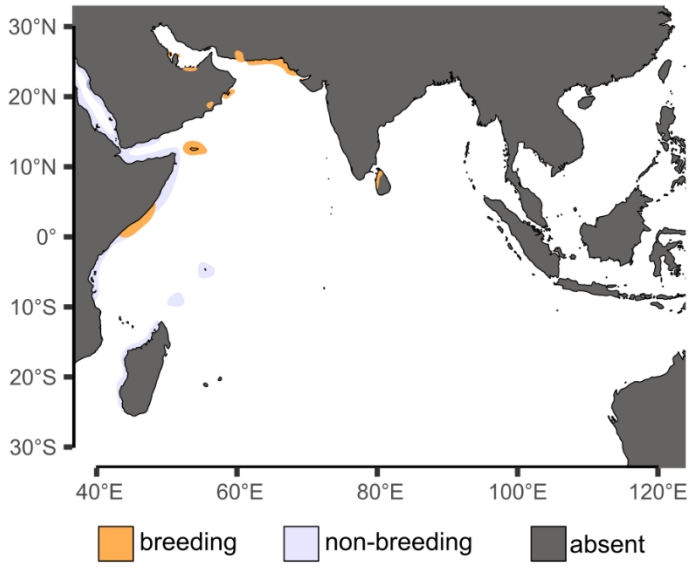


Figure 9: Indian Ocean-wide distribution map of Saunders's Tern (Bondhu dhooni; *Sternula saundersi*).

6.1.6.4. Breeding biology

Average clutch	Incubation	Fledge	Nest	Diet
2 eggs	18–19 d	23–28 d	Sand, shell, coral, rock, vegetation	Small fish

Timing: Karachi, Pakistan: breeding begins in May (Gochfeld *et al*., 2020e). Sri Lanka: breeding in May (Gochfeld *et al*., 2020e). In Red Sea colonies: breeding begins in April (Gochfeld *et al*., 2020e). Nakhiloo Island, Persian Gulf: breeding in early May (Gochfeld *et al*., 2020e). Saudia Arabia: breeding February to June (Gochfeld *et al*., 2020e). Socotra: breeding May to August (Behrouzi-Rad & Tayfeh, 2008).

Nest site: Forms small and sparse colonies with nests widely spaced 20–100 m apart. Nests above high-tide line, on mudflats. Prefers small mounds of wind-blown sand around plants or other objects. Nest is a shallow scrape, bare or lined with shell fragments and small pebbles (Almalki, 2021).

Clutch size: Usually 2 eggs per clutch (Almalki, 2021).

Incubation period: 18–19 days in Sir Bani Yas Island, United Arab Emirates (Kabeer *et al*., 2020).

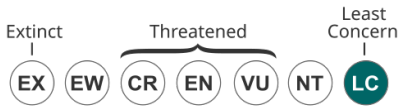
Fledging: 23–28 days after hatching (Kabeer *et al*., 2020).

Breeding success: Hatching success in Sir Bani Yas Island, United Arab Emirates, 45–63%. Fledging success 75–86% (Kabeer *et al*., 2020).

Breeding cycle and interval: Information not available/known.

6.1.7. Common Tern (Valla; *Sterna hirundo*)

IUCN status: Least Concern



Global population estimate: 1,600,000–3,600,000 birds
Global population trend: UNKNOWN

6.1.7.1. Situation in the Maldives

Traditional ecological knowledge in the Maldives considers Common Tern and Roseate Tern to be the same species, with the black-beaked Common Tern being the non-breeding type, turning into the red-beaked and red-legged Roseate Tern at the start of the breeding seasons. When the birds drink the storm water of the Kethi nakaiy (6 – 19 May), it turns their beak and legs red, commencing the beginning of its breeding period. In Dhivehi, both species share the same name ('Valla').

Phillips (1964) considered Common Tern as an occasional winter visitor to the Maldives. Ash and Shafeeg (1994) considered Common Tern as an irregular winter visitor.

6.1.7.2. Indian Ocean distribution

Breeding distribution:

Across Eurasia, but central Asian breeding range does not extend south of the Himalaya (Arnold *et al.*, 2020) (Figure 10).

Non-breeding distribution:

Wide-ranging, with long migratory movements. Wintering along east African coast, on coasts and islands of the Indian Ocean, Western Australia. Almost exclusively marine during overwintering period but returning to islands for roosting at night. Birds from Black Sea have been recovered in Somalia, eastern European populations migrate along the East African coast. Migratory patterns of breeding populations in Europe and America are well studied, but little is known about migration routes and behaviour of the Central Asian

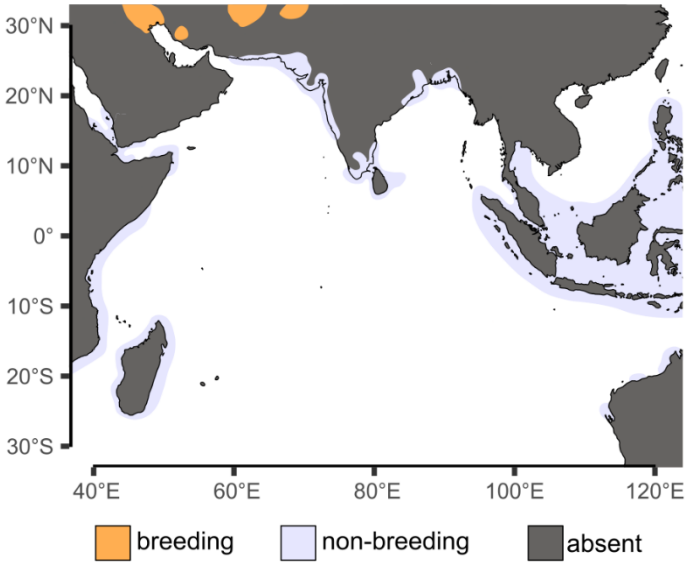


Figure 10: Indian Ocean-wide distribution map of Common Tern (Valla; *Sterna hirundo*).

populations but considered to winter mostly along the coasts of the Indian subcontinent (Arnold *et al*., 2020).

6.1.7.3. Breeding biology

A purely migratory species in the Maldives, breeding not occurring.

Average clutch	Incubation	Fledge	Nest	Diet
2–3 eggs	22–23 d	22–30 d	Scrape/hollow on ground in substrate	Small fish

Timing: A widespread species occurring across temperate, sub-tropic, and tropic environments, so timing of breeding is highly variable depending on location and strength of seasonality (Van Halewyn, 1985).

Nest site: Nest a scrape/hollow on the ground, primarily in open areas with loose substrate (sand, gravel, shell, cobble, bare soil), but with scattered vegetation (Arnold *et al*., 2020).

Clutch size: 2–3 eggs per clutch (Arnold *et al*., 2020).

Incubation period: On average 22–23 days (Courtney, 1979; Nisbet & Cohen, 1975).

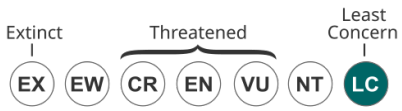
Fledging: 22–30 days (Nisbet & Drury, 1972) (Burger & Gochfield, 1991).

Breeding success: Fledglings per breeding pair are highly variable, varying form zero (resulting from heavy predation or flooding) to >2.5 fledged chicks per year. Breeding success is consistently higher in larger colonies (Arnold *et al*., 2020).

Breeding cycle and interval: Majority of birds first breed at age three (Arnold *et al*., 2020).

6.1.8. Black-naped Tern (Kiru dhooni; *Sterna sumatrana*)

IUCN status: Least Concern



Global population estimate: 92,367 birds
Global population trend: UNKNOWN

Table 6: Distribution of Black-naped Tern (Kiru dhooni; *Sterna sumatrana*) in the Maldives. Status: b = breeding; b? = breeding suspected; nb = non-breeding; - = absent/vagrant. Population: + = 1–10; ++ = 11–100; +++ = 101–1,000; ++++ = > 1,000 birds estimated; ? = no estimate. If breeding is occurring, no information on non-breeding status and population sizes is provided.

Area	Natural atoll	Administrative atoll	Status	Population
North	Ihavandhippolhu	HA.	b	?
	Thiladunmathi	HA. + HDh.	b	+++
	Makunudhoo	HDh.	b	?
	Miladhunmadulu	Sh. + N.	b	+++
	North Maalhosmadulu	R.	b	++
	South Maalhosmadulu	B.	b	++
	Goifulhafehendhu	B.	nb	+++
	Faadhippolhu	Lh.	b	?
Central	Thoddu	AA.	-	-
	Ari	AA. + ADh.	b	++
	South Male	K.	b	+++
	Felidhoo	V.	b	+++
	North Nilandhoo	F.	b	+++
	South Nilandhoo	Dh.	b	?
	Mulaku	M.	b	+++
	Kolhumadulu	Th.	b	++
	Haddhunmathi	L.	b	++
South	Huvadhoo	GA. + GDh.	b	++
	Fuvahmulah	Gn.	-	-
	Addu	S.	b	?

6.1.8.1. Situation in the Maldives

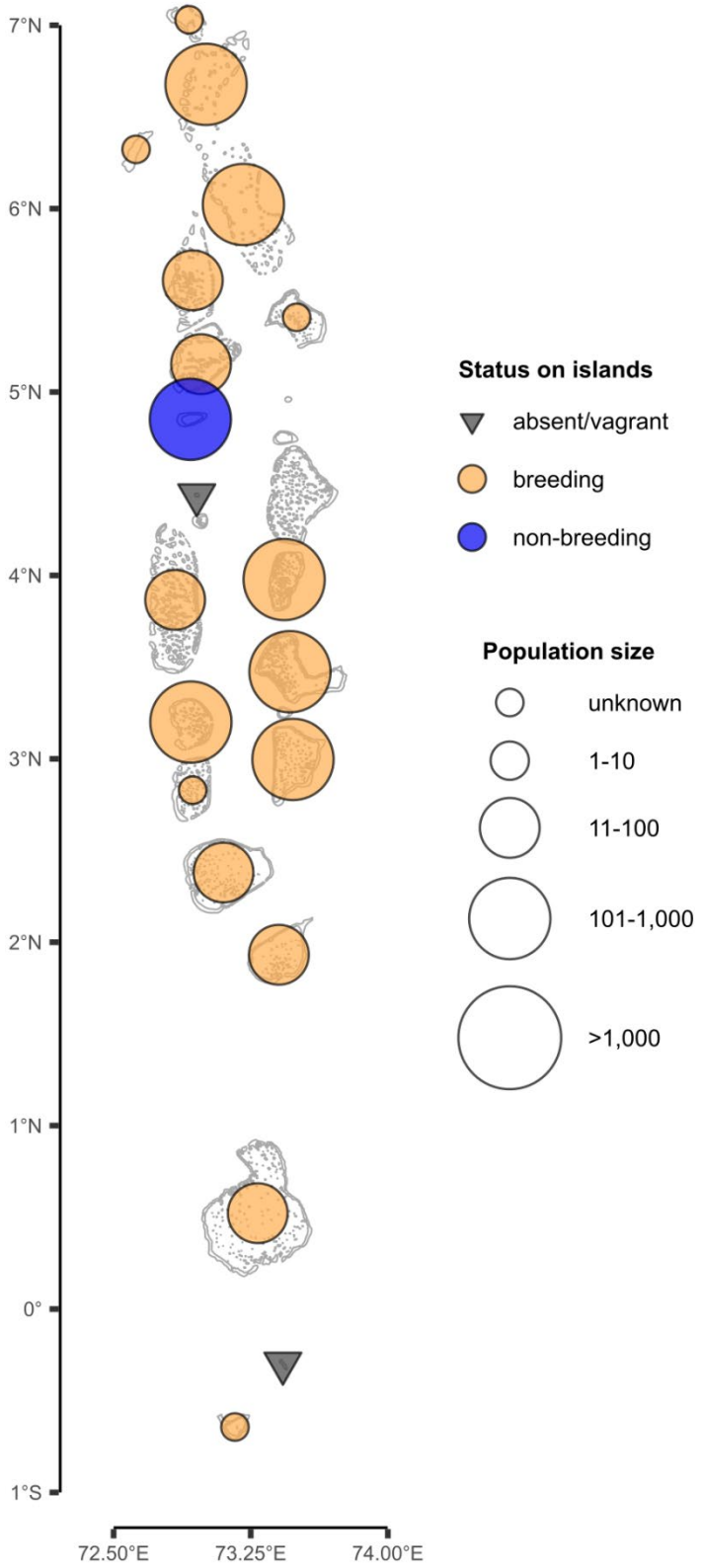
Black-naped Tern is the most widely occurring breeding seabird species in the Maldives (Figure 11). However, colonies are widely poached for their eggs, and interviewees generally noted a decline in numbers or the entire disappearance of this species from some atolls. Other main concerns widely identified by interviewees were the loss of breeding islands either due to resort construction, deforestation, or too frequent disturbance of sandbanks by resort picnic trips or from sand mining. However, Black-naped Terns may respond very well to artificial nesting platforms or habitat protection, as several interviewees noted that Black-naped Terns rapidly colonise resort construction sites or dredged islands for breeding, and in one instance a population was seen to rapidly increase during resort construction, up until resort operation began when the birds deserted the island again.

Phillips (1964) reported Black-naped Terns as the most abundant and widespread tern in the Maldives and breeding in large numbers. Ash and Shafeeg (1994) reported Black-naped Terns as the most abundant and widespread tern and present year-round.

6.1.8.2. Atoll-level summary

Northern Maldives
Ihavandhippolhu: breeding on HA. Gallandhoo, formerly more widespread.
Thiladunmathi: breeding on HA. Beenaafushi (Bibeerah), on rocky banks ('huraa ganduthah') in northern parts (HA.) of the atoll, estimated 150–500 birds. Not known to breed in southern parts (HDh.) of the atoll.
Makunudhoo: breeding on rocky banks ('hura gandu') and sandbanks ('finolhuthah').
Miladhunmadulu: breeding and roosting on Sh. Gallaidhoo, Sh. Kudafarufinolhu, N. Orivaru, N. Loafaru, N. Dhekenanfaru, N. Raafushi, and other sandbanks ('finolhuthah'), estimated 50–300 birds.
North Maalhosmadulu: breeding on R. Bodufenmaaen'boodhoo, R. Lun'dhufushi, R. Madivaafaru, and sandbanks ('finolhuthah'), estimated 60–70 birds.
South Maalhosmadulu: roosting and breeding on sandbanks ('finolhuthah'), incl. B. Boifarufinolhu, B. Landaagiraavaru falhu, and a sandbank near B. Horubadhoo, estimated 30–50 birds.
Goifulhafehendhu: only known roosting on the sandbanks ('finolhuthah'), as much as 1,000 birds. Formerly also breeding in Dhoru Kandu Huraa.
Faadhippolhu: breeding on sandbanks ('finolhuthah'), Lh. Habareyfinolhu.

Central Maldives
Thoddu: not known to nest, formerly more common, nowadays only 2–4 birds seen occasionally.
Ari: breeding on rocky banks ('gaa huraa') and sandbanks ('finolhuthah') near ADh. Mahchafushi and ADh. Vakarufalhi, estimated 50–100 birds.



South Male: temporarily breeding on resort construction sites and dredged areas, estimated 100–300 birds. Roosting in reclaimed areas nearby K. Guraidhoo.
Felidhoo: breeding, estimated minimum 100 birds.
North Nilandhoo: breeding on F. Filitheyo, uninhabited islands, rocky banks, and sandbanks ('finolhuthah'), estimated 100–1,000 birds. Formerly more widespread.
South Nilandhoo: breeding on sandspits ('thundi') and sandbanks ('finolhuthah'). Formerly more common.
Mulaku: breeding on rocky banks ('gaa huraa') and 3–4 other sandbanks ('finolhuthah') on the atoll, estimated 400 birds.
Kolhumadulu: breeding on Th. Vandhoo, Th. Kan'doodhoo, Th. Fushi, Th. Vanbadhi, Th. Kafidhoo, Th. Kakolhas, Th. Olhufushifinolhu, Th. Bodurehaa, Th. Kan'dufushi, Th. Kudarehaa, on sandspits and sandbanks ('finolhuthah'). Formerly in large numbers, nowadays estimated 20–30 birds.
Haddhunmathi: breeding on L. Bodufinolhu (near L. Vadinolhu), and roosting on sandbanks ('finolhuthah'), estimated 20–30 birds.

Figure 11: Distribution of Black-naped Tern (Kiru dhooni; *Sterna sumatrana*) in the Maldives. When breeding is occurring on an atoll, no information on roosting is provided. If only roosting is indicated, it means that no breeding is known to occur in the atoll.

Southern Maldives

Huvadhoo: breeding in low numbers (2–12 birds) in northern parts (GA.) of the atoll on GA. Hithaadhoo, GA. Dhevaalaabadhoo, GA. Hinaamaagalaa. Also, on sandbanks ('finolhuthah') in southern parts (GDh.) of the atoll. Roosting on GA. Keyvalehuttaa. Estimated 10–500 birds.

Fuvahmulah: not known to breed.

Addu: formerly breeding and present in large numbers (1,000–2,000 birds), nowadays breeding on S. Kandiheragan'du.

6.1.8.3. Indian Ocean distribution

Breeding distribution:

Breeds in Andaman and Nicobar Islands, east to southern Japan and China, and south through Malaysia, Philippines, Indonesia and New Guinea. They also breed further west, in the Seychelles (Aldabra, Farquhar, Alphonse, Amirante), Chagos, and Maldives (Gochfeld *et al*., 2020a) (Figure 12).

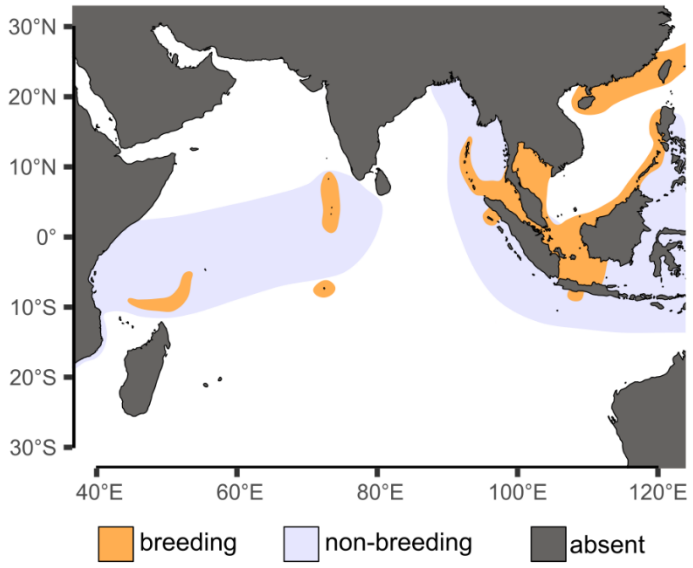


Figure 12: Indian Ocean-wide distribution map of Black-naped Tern (Kiru dhooni; *Sterna sumatrana*).

Non-breeding distribution:

During the non-breeding season, individuals sometimes remain resident around colonies, disperse to pelagic offshore environment. Migration routes, if any, are not documented (Gochfeld *et al*., 2020a).

6.1.8.4. Breeding biology

Average clutch	Incubation	Fledge	Nest	Diet
1–2 eggs	21–23 d	21–28 d	Unlined depression; gravel or sand	Small fish

Timing: Not highly synchronous. Indian Ocean: breeding September to November (Eriksen & Victor, 2013). Aldabra atoll: majority begin breeding in January ot February, but about 25% of nests start later in March to June (Diamond & Prŷs-Jones, 1986). Philippines: breeding in July (Gochfeld *et al*., 2020a). North-eastern Australia: breeding in September (Gochfeld *et al*., 2020a).

Nest site: Nest an unlined depression in sand or in gravel or pockets on coral banks, close to high-tide line, sometimes demarcated with shell or with fragments of coral; sometimes on or next to vegetation (Gochfeld *et al*., 2020a). May also nest on artificial structures. Most nest sites on bare rock, a few in small tussocks of coarse grass (Gochfeld *et al*., 2020a). Usually forms small colonies of 5–20 pairs, sometimes up to 200 pairs; colonies are often monospecific but may be associated with Roseate Tern (Valla) or Bridled Tern (Vaali; *Onychoprion anaethetus*) (Gochfeld *et al*., 2020a).

Clutch size: Usually 1–2 eggs per clutch across Indian Ocean colonies, but 2–3 eggs reported from Andaman Islands (Gochfeld *et al*., 2020a).

Incubation period: Incubation 21–23 days (Gochfeld *et al*., 2020a).

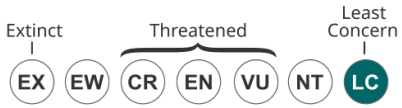
Fledging: Great Barrier Reef: 21–23 days after hatching (Hulsman & Smith, 1988). Aldabra atoll: 24–28 days after hatching (Diamond & Prŷs-Jones, 1986).

Breeding success: Many nests lost to flooding; typically, 1–20% of eggs result in fledged young. Extremely sensitive to disturbance, with relatively little disturbance needed to cause nest desertion (Gochfeld *et al*., 2020a).

Breeding cycle and interval: Information is not available/known.

6.1.9. Roseate Tern (Valla; *Sterna dougallii*)

IUCN status: Least Concern



Global population estimate: 200,000–220,000 birds
Global population trend: UNKNOWN

Table 7: Distribution of Roseate Tern (Valla; *Sterna dougallii*) in the Maldives.
Status: b = breeding; b? = breeding suspected; nb = non-breeding; - = absent/vagrant. Population: + = 1–10; ++ = 11–100; +++ = 101–1,000; ++++ = > 1,000 birds estimated; ? = no estimate. If breeding is occurring, no information on non-breeding status and population sizes is provided.

Area	Natural atoll	Administrative atoll	Status	Population
North	Ihavandhippolhu	HA.	b	?
	Thiladunmathi	HA. + HDh.	nb	++
	Makunudhoo	HDh.	b	++
	Miladhunmadulu	Sh. + N.	b	+++
	North Maalhosmadulu	R.	b	++
	South Maalhosmadulu	B.	b	?
	Goifulhafehendhu	B.	-	-
	Faadhippolhu	Lh.	b	+++
Central	Thoddu	AA.	-	-
	Ari	AA. + ADh.	b	++
	South Male	K.	b	?
	Felidhoo	V.	b	?
	North Nilandhoo	F.	-	-
	South Nilandhoo	Dh.	b	+
	Mulaku	M.	b	++
	Kolhumadulu	Th.	b	++
	Haddhunmathi	L.	-	-
South	Huvadhoo	GA. + GDh.	b	++
	Fuvahmulah	Gn.	-	-
	Addu	S.	nb	+

6.1.9.1. Situation in the Maldives

The Roseate Tern is a widely occurring breeding seabird species (Figure 13). It is heavily poached for its eggs, with interviewees reporting thousands of eggs being taken from single sandbanks (‘finolhuthah’), particularly in the past. One interviewee from North Nilandhoo atoll (F. Nilandhoo) stated that his family lived only on the income from poaching and selling Roseate Terns when he was young, but the species disappeared entirely from the atoll and has not been seen for 10 years. The disturbance of sandbanks from visitors, as well as removal of sand for construction or direct development are considered further drivers for the Roseate Tern’s overall decline in the Maldives.

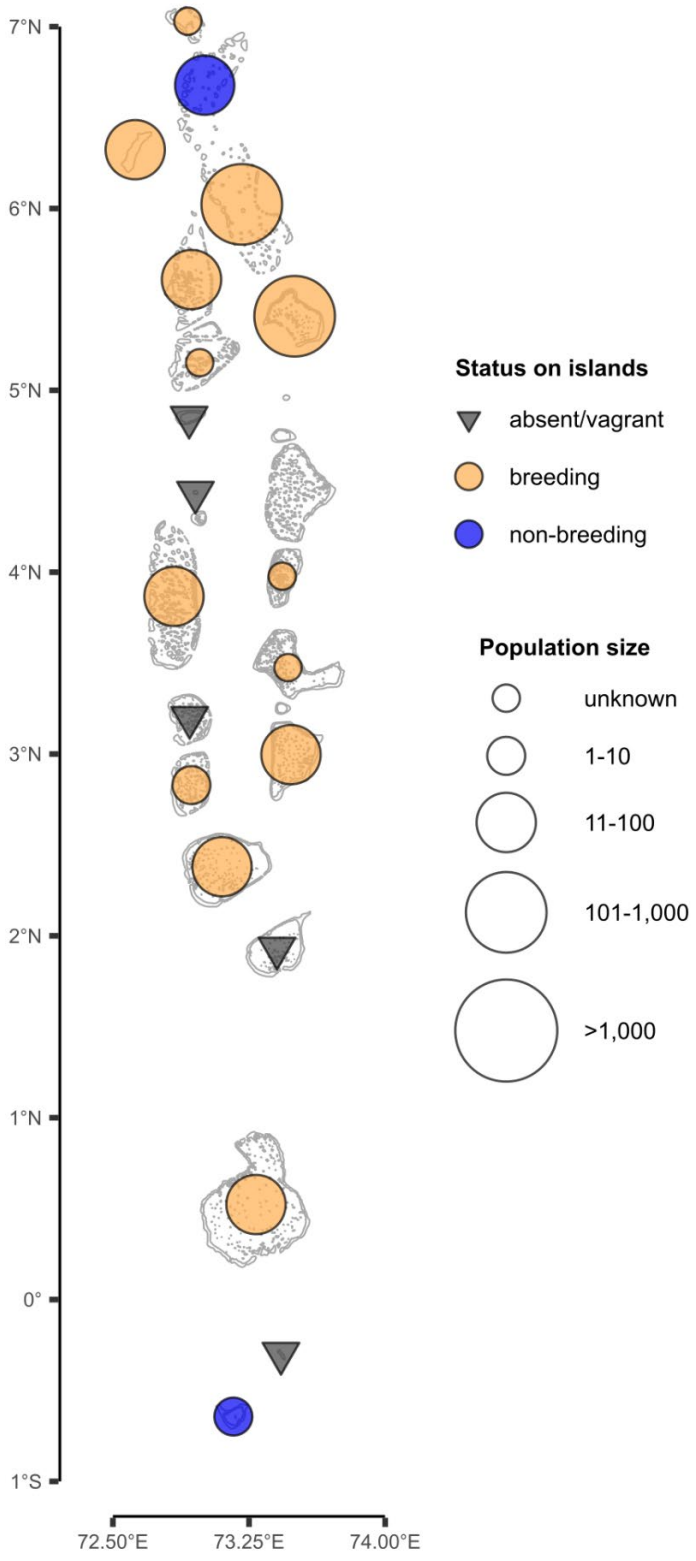
Traditional ecological knowledge relates Roseate Tern to Common Tern, as it is believed that the Roseate Tern loses its red beak colour after breeding at the beginning of the southwest monsoon (Hulhangu) and thus turns into the black-beaked Common Tern. Traditional ecological knowledge from Miladhunmadulu and Faadhippolhu atolls relates breeding to the Kethi, Roanu, and Miaheli nakaiy (6 May – 16 June), stating that the birds drink the storm water of the Kethi nakaiy, which turns their beak and legs red. In Dhivehi, both species share the same name (‘Valla’).

Phillips (1964) refered to the status of Roseate Tern as unknown but considered it to be breeding. Ash and Shafeeg (1994) reported the Roseate Tern to be breeding throughout the Maldives.

6.1.9.2. Atoll-level summary

Northern Maldives
Ihavandhippolhu: breeding on HA. Innafinolhu, roosting on HA. Gallandhoo.
Thiladunmathi: only known roosting, estimated 10–150 birds.
Makunudhoo: breeding on HDh. Innafushi and sandbanks (‘finolhuthah’), estimated 10–12 birds.
Miladhunmadulu: breeding and roosting Sh. Gallaidhoo, N. Kudafunafaru, N. Orivaru, N. Loafaru, N. Dhekenanfaru, N. Huivani, on sandspits (‘thundi’), estimated 100–200 birds.
North Maalhosmadulu: breeding on R. Lun’dhufushi and R. Madivaafaru, estimated 50–60 birds.
South Maalhosmadulu: breeding on several sandbanks (‘finolhuthah’) throughout the atoll.
Goifulhafehendhu: not observed.
Faadhippolhu: breeding on Lh. Meyyafushi, Lh. Fushifaru, and several sandbanks (‘finolhuthah’) throughout the atoll, incl. Lh. Habareyfinolhu, estimated 100–200 birds.

Central Maldives
Thoddu: formerly present, now no longer seen.



Ari: breeding on ADh. Kalhahan'dhihuraa, ADh. Thun'dufushi, and on rocky banks ('gaahuraa') and sandbanks ('finolhuthah'), estimated 20–50 birds.
South Male: breeding and roosting intermittently on freshly dredged construction and reclamation sites.
Felidhoo: breeding.
North Nilandhoo: formerly very abundant but not observed at all for 10 years.
South Nilandhoo: breeding, estimated 5–6 birds, more abundant when bait fishing is good.
Mulaku: breeding on rocky banks ('gaahuraa') and sandbanks ('finolhuthah'), incl. M. Fenbofinolhu near M. Rakeedhoo channel, estimated 30 birds.
Kolhumadulu: breeding on Th. Vandhoo, Th. Kan'doodhoo, Th. Kafidhoo, Th. Kakolhas, Th. Olhufushifinolhu, Th. Bodurehaa, Th. Kan'dufushi, Th. Kudarehaa, on sandspits ('thundi)', estimated 10–12 birds at a time. Formerly more abundant.
Haddhunmathi: only at sea inside and outside the lagoon, no more than 1–2 birds. Formerly more abundant.

Southern Maldives
Huvadhoo: breeding on GA. Hithaadhoo, GA. Hinaamaagalaa, GDh. Faanehuttaa, and GDh. Maagalaa, estimated 50–100 birds. Formerly much more abundant.
Fuvahmulah: not observed.
Addu: roosting in small numbers of less than 3 birds.

Figure 13: Distribution of Roseate Tern (Valla; *Sterna dougallii*) in the Maldives. When breeding is occurring on an atoll, no information on roosting is provided. If only roosting is indicated, it means that no breeding is known to occur in the atoll.

6.1.9.3. Indian Ocean distribution

Breeding distribution:

On islands throughout the Central and Northern Indian Ocean: Oman, Kenya, Tanzania, Madagascar, probably Mozambique, Seychelles, Sri Lanka, India, Indomalayan region and Western Australia (Gochfeld & Burger, 2020). Small breeding colony occasionally also on Chagos (Carr, 2015) (Figure 14).

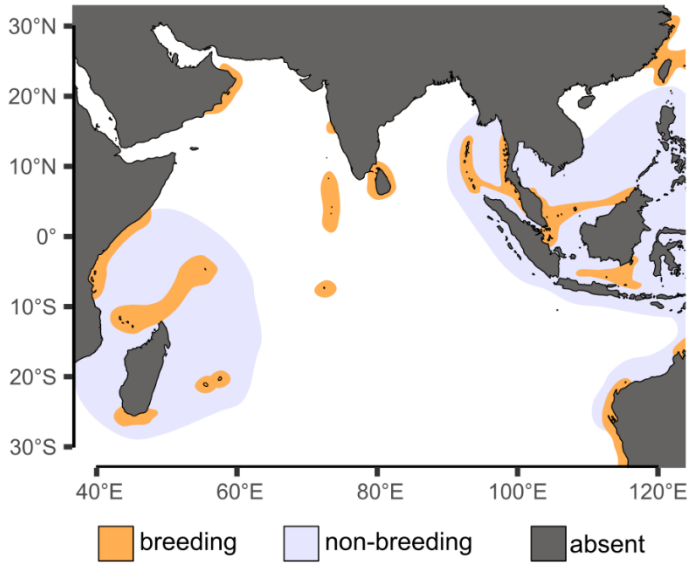


Figure 14: Indian Ocean-wide distribution map of Roseate Tern (Valla; *Sterna dougallii*).

Non-breeding distribution:

Not well understood, but generally migrating away from breeding sites. East African populations likely moving to Southern Africa (Gochfeld & Burger, 2020).

6.1.9.4. Breeding biology

Average clutch	Incubation	Fledge	Nest	Diet
1–2 eggs	21–24 d	22–30 d	Sand, shell, coral, rock, vegetation	Small fish

Timing: The availability of small fish, particularly sand lance, is probably the main determinant of timing (Gochfeld & Burger, 2020). Western Australia: breeding April (Gochfeld & Burger, 2020). India and Sri Lanka: breeding April (Gochfeld & Burger, 2020). Somalia: breeding June (Gochfeld & Burger, 2020). Seychelles: breeding July to August (Gochfeld & Burger, 2020). Southern Africa: breeding June to October (Gochfeld & Burger, 2020). Chagos: breeding October to April (Gochfeld & Burger, 2020).

Nest site: Almost exclusively on islands, mainly on very small sandy cays (Nisbet, 1981). Broad range of substrates used, including sand, shell, coral, rock, and vegetation (Gochfeld & Burger, 2020). On Aride Island, Seychelles, breeding on the ground in open *Pisonia* woodland (Monticelli *et al*., 2008; Warman, 1979). Nest usually a shallow scrape (Gochfeld & Burger, 2020). Some colonies show high site fidelity, but others shift annually among individual cays (e.g. returning only every 1–6 years to the same cay) (Pierce, 1996).

Clutch size: 1–2 eggs per clutch in tropical colonies, but a trend to larger clutch sizes in higher latitudes (Nisbet & Ratcliffe, 2008). Re-laying after loss of egg or chick observed, usually within 10–12 days after loss (Gochfeld & Burger, 2020).

Incubation period: 21–24 days (Nisbet, 1981; Nisbet & Cohen, 1975).

Fledging: 22–30 days after hatching (Nisbet & Drury, 1972).

Breeding success: Highly variable; a colony in Puerto Rico had 93% hatching success in one year, but less than 1% the following year when colony got deserted before hatching (Shealer, 1995). In Virgin Islands, average hatching success 56% (Douglas, 2001). General tendency to quickly desert colonies when disturbed (Nisbet, 1981).

Breeding cycle and interval: Majority of birds begin breeding at age 3–4 (Lebreton *et al*., 2003). Considered to breed annually (Nisbet & Ratcliffe, 2008). High site fidelity to breeding sites, with 58–91% of surviving chicks returning to their natal site 3–5 years later (Lebreton *et al*., 2003).

6.1.10. Lesser Crested Tern (Ainmathee gaadhooni; *Thalasseus bengalensis*)

IUCN status: Least Concern

Global population estimate: 450,000 birds
Global population trend: STABLE

Table 8: Distribution of Lesser Crested Tern (Ainmathee gaadhooni; *Thalasseus bengalensis*) in the Maldives. Status: b = breeding; b? = breeding suspected; nb = non-breeding; - = absent/vagrant. Population: + = 1–10; ++ = 11–100; +++ = 101–1,000; ++++ = > 1,000 birds estimated; ? = no estimate. If breeding is occurring, no information on non-breeding status and population sizes is provided.

Area	Natural atoll	Administrative atoll	Status	Population
North	Ihavandhippolhu	HA.	nb	+
	Thiladunmathi	HA. + HDh.	nb	+
	Makunudhoo	HDh.	nb	?
	Miladhunmadulu	Sh. + N.	nb	+
	North Maalhosmadulu	R.	nb	++
	South Maalhosmadulu	B.	nb	++
	Goifulhafehendhu	B.	nb	++
	Faadhippolhu	Lh.	nb	++
Central	Thoddu	AA.	-	-
	Ari	AA. + ADh.	nb	++
	South Male	K.	nb	++
	Felidhoo	V.	-	-
	North Nilandhoo	F.	nb	++
	South Nilandhoo	Dh.	-	-
	Mulaku	M.	nb	+
	Kolhumadulu	Th.	nb	++
	Haddhunmathi	L.	nb	+
South	Huvadhoo	GA. + GDh.	nb	++
	Fuvahmulah	Gn.	-	-
	Addu	S.	b	?

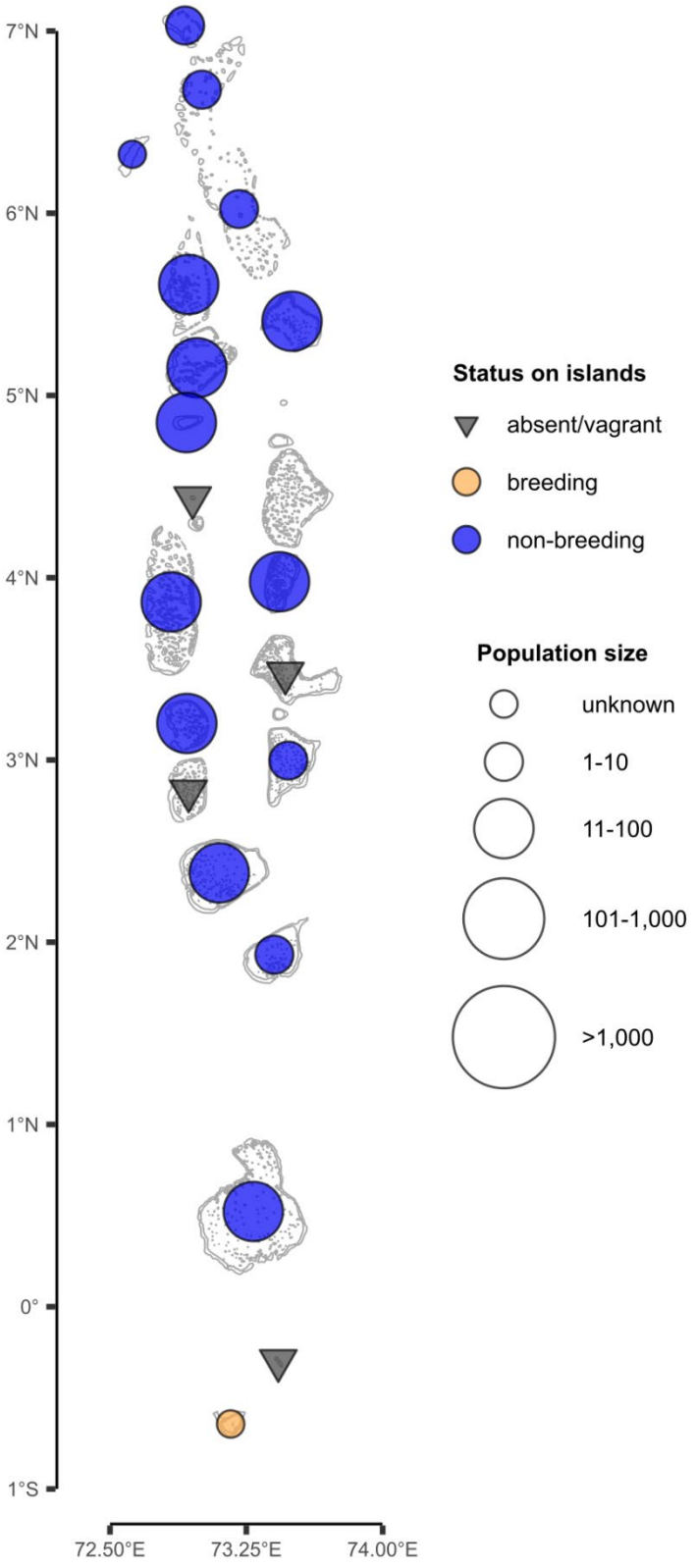
6.1.10.1.Situation in the Maldives

The Lesser Crested Tern (*Thalasseus bengalensis*) is a widely occurring migratory seabird species (Figure 15). Its occurrence in the Maldives is linked to the northeast monsoon season (Iruvai). Two ringed Lesser Crested Terns from colonies in Bahrain, Persian Gulf, were recovered in late October and mid-January in the Maldives in North Nilandhoo (Faafu) and Haddhunmathi (Laamu) atolls (Kavanagh *et al*., 2017). Interviewees indicated that Lesser Crested Terns historically also nested in the Maldives, and some also referred to active breeding sites, which may however be confused with the similar Great Crested Tern (*Thalasseus bergii*). Overall, Lesser Crested Terns are observed to be becoming less abundant, which is generally attributed to the loss of sandbanks due to resort development, construction, dredging, and sand mining.

Phillips (1964) reported the Lesser Crested Tern to be resident in moderate numbers and breeding. Ash and Shafeeg (1994) considered the Lesser Crested Tern resident in the Maldives but present only between October and May.

6.1.10.2. Atoll-level summary

Northern Maldives
Ihavandhippolhu: roosting on HA. Gallandhoo, estimated 5–10 birds.
Thiladunmathi: roosting on sandbanks (‘finolhuthah’), estimated less than 10 birds.
Makunudhoo: roosting.
Miladhunmadulu: roosting on sandbanks (‘finolhuthah’), estimated less than 10 birds. Formerly more abundant.
North Maalhosmadulu: roosting, estimated 10–15 birds.
South Maalhosmadulu: roosting, estimated no more than 30 birds. Formerly also breeding on B. Nelivarufinolhu.
Goifulhafehendhu: roosting, no more than 20 birds.
Faadhippolhu: roosting, estimated 50–100 birds.



Central Maldives

Thoddu: not observed.

Ari: roosting, estimated 30–40 birds.

South Male: roosting, estimated 10–50 birds. Formerly more abundant.

Felidhoo: only at sea inside the lagoon, estimated 10–15 birds.

North Nilandhoo: roosting on sandbanks ('finolhuthah'), estimated 5–30 birds. Formerly more abundant.

South Nilandhoo: occasionally single birds seen at sea over schooling fish. Formerly tentatively breeding on sandbanks ('finolhuthah').

Mulaku: roosting on islands and seen roosting on fish aggregating devices, no more than 3–10 birds at a time.

Kolhumadulu: roosting on sandbanks ('finolhuthah'), estimated 50–80 birds.

Haddhunmathi: occasionally seen roosting on sandbanks ('finolhuthah'), no more than 2–4 birds at a time.

Southern Maldives

Huvadhoo: roosting in northern (GA.) and southern (GDh.) parts of the atoll, estimated up to 50 birds.

Fuvahmulah: not observed.

Addu: breeding on S. Kand'diheragandu and S. Mulikede.

Figure 15: Distribution of Lesser Crested Tern (Ainmathee gaadhooni; *Thalasseus bengalensis*) in the Maldives. When breeding is occurring on an atoll, no information on roosting is provided. If only roosting is indicated, it means that no breeding is known to occur in the atoll.

6.1.10.3. Indian Ocean distribution

Breeding distribution:

Red Sea, Persian Gulf, and along coasts of north-western Indian Ocean, mainly Pakistan, Oman, United Arab Emirates, Lakshadweep, in north-western Australia (Gochfeld *et al*., 2020d) (Figure 16).

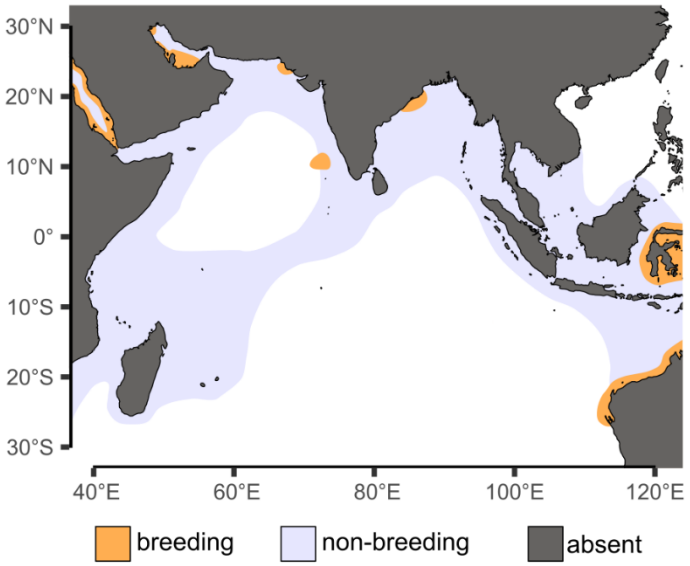


Figure 16: Indian Ocean-wide distribution map of Lesser Crested Tern (Ainmathee gaadhooni; *Thalasseus bengalensis*).

Non-breeding distribution:

Wide-ranging and exact movement patterns not well understood. Considered only partly migratory in most of range, but some Red Sea and Persian Gulf birds may winter along east African coast, Madagascar, Sri Lanka. Persian Gulf birds migrating into Indian Ocean, moving along west Indian coast and to southern India, Sri Lanka, and Maldives, some birds moving east into the Indomalayan region (Gochfeld *et al*., 2020d).

6.1.10.4. Breeding biology

Average clutch	Incubation	Fledge	Nest	Diet
1 egg	21–26 d	30–35 d	Shallow, unlined scape	Fish, shrimps

Timing: Persian Gulf: breeding May to June (Gochfeld *et al*., 2020d). Libya: breeding July to August (Gochfeld *et al*., 2020d). Somalia: breeding August (Gochfeld *et al*., 2020d). Eastern Australia: breeding September to December (Gochfeld *et al*., 2020d). Northern Australia: breeding March to June (Gochfeld *et al*., 2020d). Western Australia: two seasonal peaks in March to June and September to December (Gochfeld *et al*., 2020d).

Nest site: Breeds on low-lying coral islands and sandy cays. Nest a shallow unlined scrape in sand or shells, usually selecting ridges or bare areas nearby vegetation. (Gochfeld *et al*., 2020d).

Clutch size: 1 egg, rarely 2 (Gochfeld *et al*., 2020d).

Incubation period: 21–26 days (Gochfeld *et al*., 2020d).

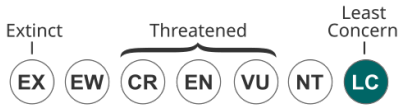
Fledging period: 30–35 days (Gochfeld *et al*., 2020d).

Breeding success: Information not available/known.

Breeding cycle and interval: Age of first breeding presumed 2 years (Gochfeld *et al*., 2020d).

6.1.11. Great Crested Tern (Bodu gaadhooni; *Thalasseus bergii*)

IUCN status: Least Concern



Global population estimate: 150,000–1,100,000 birds
Global population trend: STABLE

Table 9: Distribution of Great Crested Tern (Bodu gaadhooni; *Thalasseus bergii*) in the Maldives. Status: b = breeding; b? = breeding suspected; nb = non-breeding; - = absent/vagrant. Population: + = 1–10; ++ = 11–100; +++ = 101–1,000; ++++ = > 1,000 birds estimated; ? = no estimate. If breeding is occurring, no information on non-breeding status and population sizes is provided.

Area	Natural atoll	Administrative atoll	Status	Population
North	Ihavandhippolhu	HA.	b	?
	Thiladunmathi	HA. + HDh.	nb	+++
	Makunudhoo	HDh.	b	?
	Miladhunmadulu	Sh. + N.	b	++
	North Maalhosmadulu	R.	nb	++
	South Maalhosmadulu	B.	b	++
	Goifulhafehendhu	B.	nb	++
	Faadhippolhu	Lh.	nb	+++
Central	Thoddu	AA.	-	-
	Ari	AA. + ADh.	b	++
	South Male	K.	nb	++
	Felidhoo	V.	nb	+++
	North Nilandhoo	F.	-	-
	South Nilandhoo	Dh.	-	-
	Mulaku	M.	-	-
	Kolhumadulu	Th.	-	-
	Haddhunmathi	L.	-	-
South	Huvadhoo	GA. + GDh.	b	?
	Fuvahmulah	Gn.	-	-
	Addu	S.	-	-

6.1.11.1.Situation in the Maldives

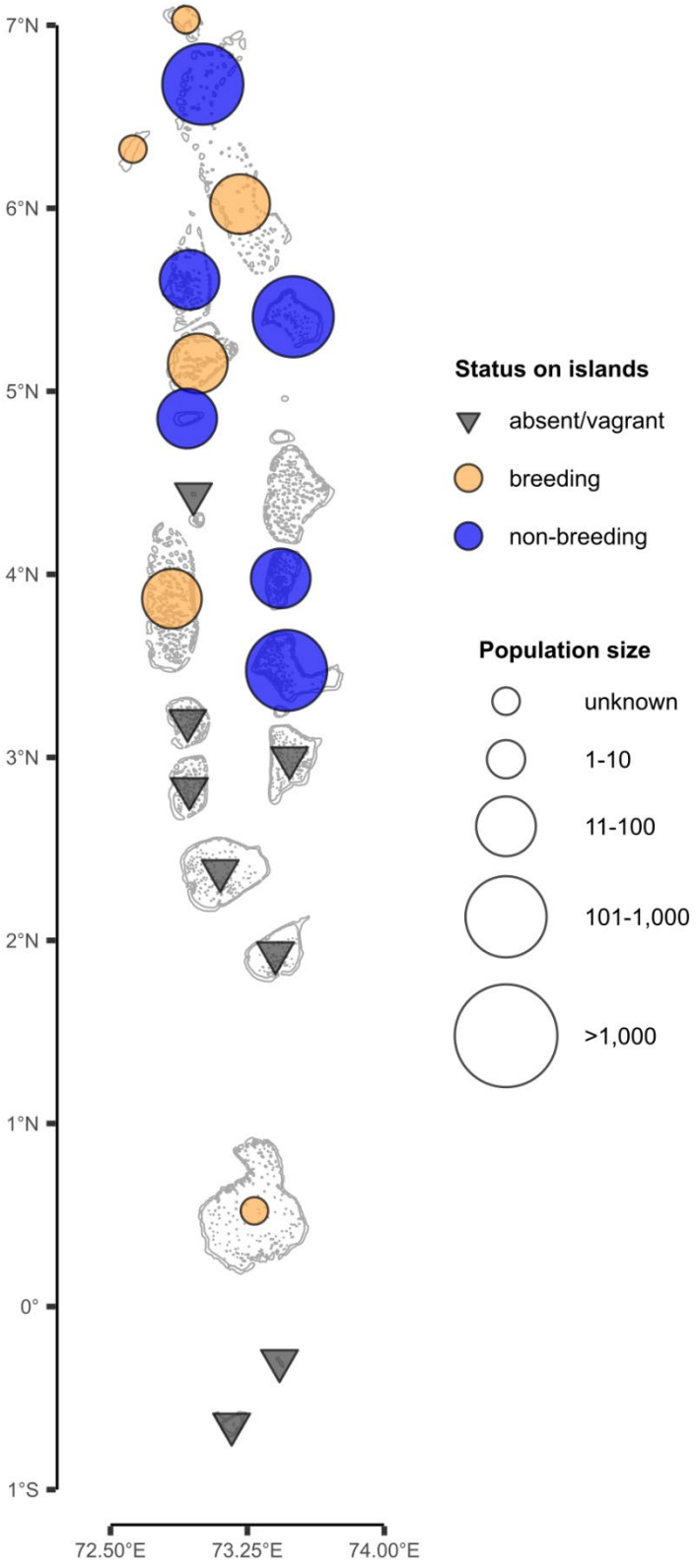
The Great Crested Tern is a regionally occurring breeding seabird species (Figure 17). It is one of the most heavily poached seabirds and kept as a pet. Throughout the Maldives, interviewees indicated a disappearance of Great Crested Terns both as a breeding species and from known roosting islands. Its occurrence is generally related to the northeast monsoon season (Iruvai) and considered to be most abundant during the high bait-fish season.

Phillips (1964) reported Great Crested Tern as resident and widespread in small numbers, and breeding. Ash and Shafeeg (1994) reported Great Crested Tern as resident and widespread in small numbers and locally breeding.

6.1.11.2. Atoll-level summary

Northern Maldives
Ihavandhippolhu: breeding and roosting, including on HA. Gallandhoo.
Thiladunmathi: roosting on islands, artificial buoys and fish aggregating devices, estimated 100–300 birds during southwest monsoon.
Makunudhoo: breeding and roosting in rocky banks (‘huraa gandu’) and sandbanks (‘finolhuthah’).
Miladhunmadulu: breeding on Sh. Naalaahuraa, N. Raafushi, and N. Kan’dinmaahuraa, estimated less than 100 birds. Formerly more abundant.
North Maalhosmadulu: roosting on sandbanks (‘finolhuthah’), estimated 20–30 birds.
South Maalhosmadulu: breeding on sandbanks (‘finolhuthah’), estimated 15–20 birds. Formerly more abundant.
Goifulhafehendhu: roosting, estimated 20 birds.
Faadhippolhu: roosting, estimated over 100 birds.

Central Maldives
Thoddu: not observed.
Ari: breeding on sandbanks (‘finolhuthah’) where there are small coral rocks, ADh. Rahddhiggaa (ADh. Fushidhigga), ADh. Dhigurahfinolhu, estimated 5–30 birds. Formerly more abundant.
South Male: roosting, estimated 5–50 birds.
Felidhoo: roosting on V. Faahura and generally considered abundant in the atoll, estimated 200 birds.
North Nilandhoo: roosting on sandbanks (‘finolhuthah’) in the past, now mostly disappeared. Sometimes 10–20 birds seen.
South Nilandhoo: in the past breeding on sandbanks and uninhabited islands. Occasionally single birds observed outside the lagoon, abundant over large fish schools inside the lagoon.
Mulaku: only observed at sea, no known roosting islands in the atoll.



Kolhumadulu: in the past roosting on sandspits (‘thundi’) estimated 50–100 birds. Nowadays very rare, single birds observed mostly at sea inside and outside the lagoon.
Haddhunmathi: only seen at sea inside the lagoon in small numbers, not more than 1–2 birds at a time, sometimes 5–10. Numbers decreasing.

Southern Maldives
Huvadhoo: rare breeding in northern parts (GA.) of the atoll and roosting on GA. Hithaadhoo, in southern parts (GDh.) only roosting, less than 10 birds estimated.
Fuvahmulah: not observed.
Addu: only seen at sea inside and outside the lagoon, not more than 2–3 birds at a time.

Figure 17: Distribution of Great Crested Tern (Bodu gaadhooni; *Thalasseus bergii*) in the Maldives. When breeding is occurring on an atoll, no information on roosting is provided. If only roosting is indicated, it means that no breeding is known to occur in the atoll.

6.1.11.3.Indian Ocean distribution

Breeding distribution:

Coastal Africa, Seychelles, Aldabra atoll, Rodrigues Island, Madagascar, Red Sea, Persian Gulf, Maldives, Lakshadweep, Sri Lanka, south-eastern China to Philippines, Indo-Malayan region, Australia (Gochfeld *et al*., 2020c) (Figure 18).

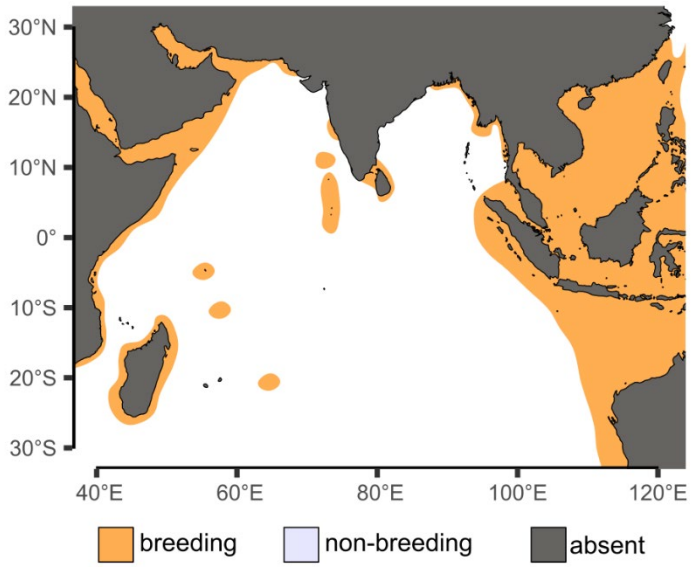


Figure 18: Indian Ocean-wide distribution map of Great Crested Tern (Bodu gaadhooni; *Thalasseus bergii*).

Non-breeding distribution:

During the non-breeding season, movement patterns are mostly unknown. Many populations remain resident around breeding areas. Some Australian colonies known to disperse several hundred kilometres around colony. Birds in Red Sea and Persian Gulf migrate to East African coast (Gochfeld *et al*., 2020c).

6.1.11.4.Breeding biology

Average clutch	Incubation	Fledge	Nest	Diet
1–2 eggs	25–30 d	38–40 d	Scrape; sand, rock, coral	Mainly fish

Timing: Indian Ocean colonies: breeding April to June (Gochfeld *et al*., 2020c). Somalia: breeding August (Gochfeld *et al*., 2020c). Kenya: breeding October (Gochfeld *et al*., 2020c). Tanzania: breeding November (Gochfeld *et al*., 2020c). South-western Australia: breeding in two peaks, April to May and October to November (Gochfeld *et al*., 2020c). Aldabra atoll: breeding in two peaks, January and July (Gochfeld *et al*., 2020c).

Nest site: Tropical and subtropical coasts and oceanic islands. Nest a shallow scrape in bare sand, rock, or coral; nests close together (33–44 cm apart), rims often touching (Gochfeld *et al*., 2020c). Breeding on roofs recorded in South Africa (Crawford & Dyer, 2000).

Clutch size: Usually 1–2 eggs per clutch (Gochfeld *et al*., 2020c).

Incubation period: Incubation 25–30 days (Gochfeld *et al*., 2020c).

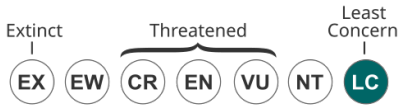
Fledging: Fledging 38–40 days after hatching but remains dependent on parental feeding at least until 120 days (Gochfeld *et al*., 2020c).

Breeding success: Highly variable, with hatching success ranging from 0.5–69% and fledging success ranging from 85–100%, depending on colony and year (Langham & Hulsman, 1986).

Breeding cycle and interval: First breeding attempts usually at age three (Gochfeld *et al*., 2020c).

6.1.12. White-tailed Tropicbird (Dhandifulhu dhooni; *Phaethon lepturus*)

IUCN status: Least Concern



Global population estimate: 400,000 birds
Global population trend: DECREASING

Table 10: Distribution of White-tailed Tropicbird (Dhandifulhu dhooni; *Phaethon lepturus*) in the Maldives. Status: b = breeding; b? = breeding suspected; nb = non-breeding; - = absent/vagrant. Population: + = 1–10; ++ = 11–100; +++ = 101–1,000; ++++ = > 1,000 birds estimated; ? = no estimate. If breeding is occurring, no information on non-breeding status and population sizes is provided.

Area	Natural atoll	Administrative atoll	Status	Population
North	Ihavandhippolhu	HA.	b	?
	Thiladunmathi	HA. + HDh.	b	?
	Makunudhoo	HDh.	-	-
	Miladhunmadulu	Sh. + N.	b	++
	North Maalhosmadulu	R.	b	++
	South Maalhosmadulu	B.	b	++
	Goifulhafehendhu	B.	-	-
	Faadhippolhu	Lh.	b	+++
Central	Thoddu	AA.	-	-
	Ari	AA. + ADh.	-	-
	South Male	K.	-	-
	Felidhoo	V.	-	-
	North Nilandhoo	F.	-	-
	South Nilandhoo	Dh.	-	-
	Mulaku	M.	b?	?
	Kolhumadulu	Th.	b	+
	Haddhunmathi	L.	b	+
South	Huvadhoo	GA. + GDh.	b	+
	Fuvahmulah	Gn.	b	+
	Addu	S.	b	+

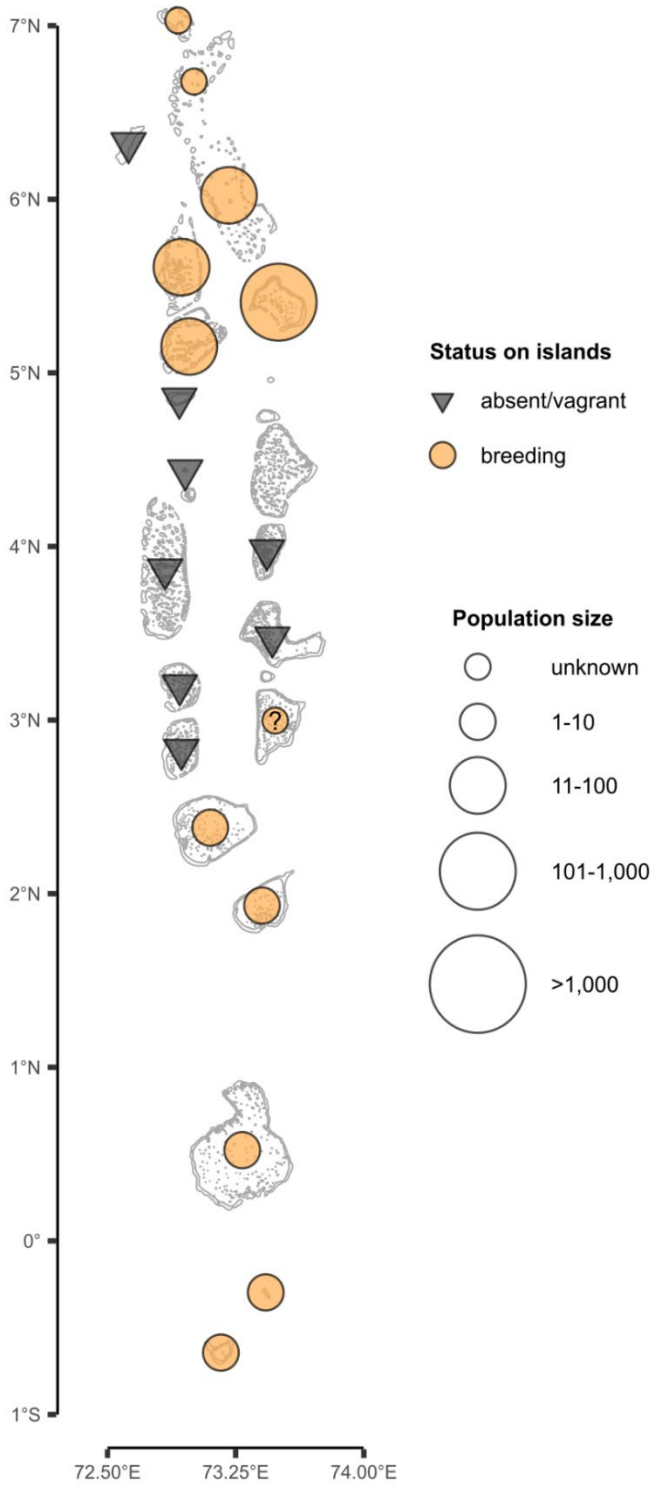
6.1.12.1. Situation in the Maldives

The White-tailed Tropicbird is a widely occurring breeding species but apparently absent from the central Maldivian atolls (Figure 19). It is known to nest in forested areas where large trees are present, primarily Banyan tree (Nika gas; *Ficus benghalensis*), Lantern tree (Kandhu gas; *Hernandia nymphaeifolia*), Breadfruit tree (Ban-bukeyo; *Artocarpus altilis*) and Cordia tree (Kaani gas; *Cordia subcordata*). It can also nest among the roots of screwpines (Kashikeyo; *Pandanus tectorius*). Where forested areas and large trees are present, White-tailed Tropicbirds can also be found on resort and local islands. Interviewees indicated repeatedly that White-tailed Tropicbirds disappeared from islands (or atolls altogether) when forests were cut down for construction and urban development. Two interviewees cited an old saying among fishers, translating to '*the tropicbird does not lie'*, highlighting their reliance on this seabird to reliably indicate schooling fish.

Phillips (1964) reported the White-tailed Tropicbird as plentiful and resident throughout the Maldives and widely breeding. Ash and Shafeeg (1994) refered to the White-tailed Tropicbird as a formerly plentiful resident throughout the Maldives that is in decline.

6.1.12.2. Atoll-level summary

Northern Maldives
Ihavandhippolhu: breeding.
Thiladunmathi: breeding in forest areas, including on inhabited islands HA. Filladhoo (Dhapparu), HA. Kelaa, and HA. Muraidhoo, as well as on uninhabited islands HDh. Keylakunu, HDh. Kudamuraidhoo, HDh. Naagoashi, HDh. Muiri, in small numbers, no more than 2–3 birds at one time.
Makunudhoo: only at sea inside and outside the lagoon.
Miladhunmadulu: breeding on resort islands, incl. N. Raafushi, and N. Vaadhoo, estimated 30–40 birds. Formerly also on N. Randheli.
North Maalhosmadulu: breeding on densely-forested uninhabited islands, incl. R. Bodufenmaaen'boodhoo, in small numbers up to 10 birds per island.
South Maalhosmadulu: breeding on several resort islands, incl. B. Finolhas (B. Amillafushi), B. Voavah, B. Milaidhoo, B. Dhigufaruvinagan'du, as well as on B. Olhugiri and B. Mendhoo, up to 10 birds per island.
Goifulhafehendhu: historically breeding in the atoll, but nowadays no breeding evidence. Birds still observed at sea inside the atoll lagoon.
Faadhippolhu: breeding on several resort islands, incl. Lh. Kurehdhoo, Lh. Huravalhi, Lh. Kanuhuraa, Lh. Dheruffinolhu, Lh. Maabinhuraa, Lh. Innahuraa, Lh. Thilamaafushi, Lh. Ookolhufinolhu; also breeding in forested part of the local island Lh. Olhuvelifushi. The largest known breeding colony in the Maldives is



Lh. Kurehdhoo with an estimated 800 bird year-round population (Russell *et al*., 2024).

Central Maldives

Thoddu: in the past, observed in small numbers (10–20 birds) at sea inside the lagoon, but nowadays no longer seen.

Ari: only at sea inside and outside the lagoon, no more than 1–2 birds at a time.

South Male: birds observed at sea inside and outside the lagoon.

Felidhoo: only at sea inside and outside the lagoon, no more than 2–3 birds at a time.

North Nilandhoo: only at sea outside the lagoon, and only rarely observed. Formerly breeding on islands in the atoll.

South Nilandhoo: only at sea outside the lagoon. Formerly breeding on islands in the atoll.

Mulaku: mostly at sea outside the lagoon; nest observed on M. Mulah ca. 2–3 years ago.

Kolhumadulu: breeding on Th. Kanimeedhoo and Th. Veymandoo, estimated 2–6 birds. Formerly more abundant.

Haddhunmathi: breeding around freshwater lake (Paree Fengandu) on L. Gan, and on L. Maandhoo, estimated 2–3 birds.

Figure 19: Distribution of White-tailed Tropicbird (Dhandifulhu dhooni; *Phaethon lepturus*) in the Maldives. When breeding is occurring on an atoll, no information on roosting is provided. If only roosting is indicated, it means that no breeding is known to occur in the atoll.

Southern Maldives
Huvadhoo: breeding on GA. Hithaadhoo, GA. Dhevvaamaagalaa, and other uninhabited islands in northern parts (GA.) of the atoll but not known to be breeding in southern parts (GDh.), estimated less than 10 birds. Formerly also on GA. Kerehdhoo, an island now leased for tourism.
Fuvahmulah: tentatively breeding in restricted area east of the airport, estimated less than 10 birds.
Addu: nests observed in Addu Nature Park and S. Vilin'gili, estimated 3–6 birds observed flying over islands.

6.1.12.3. Indian Ocean distribution

Breeding distribution:

Seychelles, Andaman Islands, Mascarene Islands, Christmas Island, Maldives, and Chagos (Lee & Walsh-McGee, 2020) (Figure 20).

Non-breeding distribution:

Disperses widely after breeding season, sometimes up to 1,000 km away from colony. Distances and direction of dispersal largely unknown for most populations. Movements probably governed by availability of fish, which in turn is governed by surface sea temperatures (Lee & Walsh-McGee, 2020).

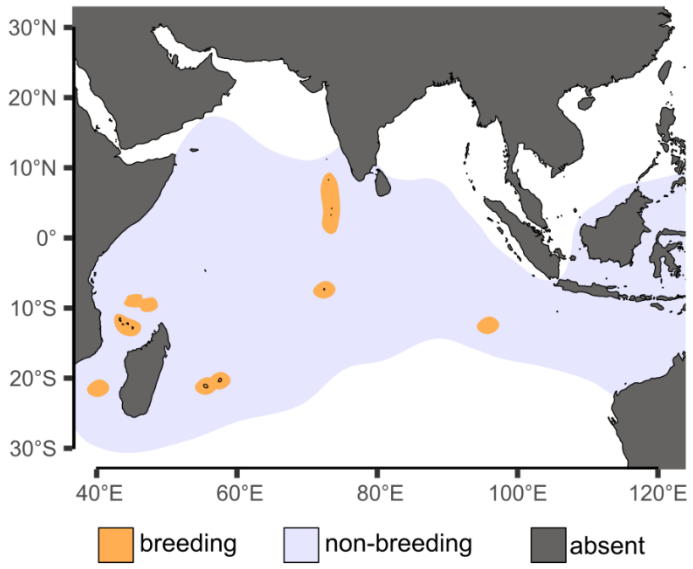


Figure 20: Indian Ocean-wide distribution map of White-tailed Tropicbird (Dhandifulhu dhooni; *Phaethon lepturus*).

6.1.12.4. Breeding biology

Average clutch	Incubation	Fledge	Nest	Diet
1 egg	40–42 d	71–73 d	In vegetation, on ground, cliffs, rocks	Fish, cephalopods

Timing: No seasonal peaks in breeding activity in tropics (Lee & Walsh-McGee, 2020). In densely populated colonies with an inadequate number of nest sites, younger birds may wait until a pair occupying a particular site completes breeding, after which they move in and begin breeding (Lee & Walsh-McGee, 2020). At all breeding colonies where phenology is fairly well documented, the majority of breeding activity occurs at times of year when cyclones do not occur, or when they

are unlikely to occur (Lee & Walsh-McGee, 2020). In cyclone-free regions, tropicbirds can nest throughout the year (Lee & Walsh-McGee, 2020).

Nest site: Wide variety of sites, ranging from closed-canopy rain forest to barren ground (Lee & Walsh-McGee, 2020). On high volcanic islands, typically nests in rugged, rocky terrain in cliffs or talus rubble near sea (Lee & Walsh-McGee, 2020). In the Pacific, often nests inland on cliffs or in caves, craters, or tree hollows or crotches (Palmer, 1962). Also, in shallow surface excavations under herbage on sand dunes (Gross, 1912). Major factors in nest-site selection are thermal requirements (including shelter from afternoon sun), presence of sand or similar substance on floor to cushion egg, protection from rain, predator avoidance, and direction of prevailing winds (Lee & Walsh-McGee, 2020). On Aldabra atoll, nest sites preferably concealed or partly concealed from above (e.g. rock, tree caves) (Prys-Jones & Peet, 1980). Most important feature influencing nest-site selection is shelter from the sun (Burger & Gochfeld, 1991). Adults incubating in exposed situations may be driven from their nest by heat stress (Stonehouse, 1962). Will also nest in tree hollows in coconut palms and other trees (Baker, 1951). No nest materials, except what may inadvertently be pushed out around scrape or already in hollows (Lee & Walsh-McGee, 2020). Not capable of cleaning debris out of nest burrows, and sites previously used are abandoned if filled with rubble by storms (Lee & Walsh-McGee, 2020). Otherwise, nest cavities often reused each year with high site fidelity (Lee & Walsh-McGee, 2020).

Clutch size: One egg per clutch; replacement laying occasionally occurring, and within 21–52 days after loss of egg or chick (Diamond, 1975c).

Incubation period: 40–42 days (Stonehouse, 1962).

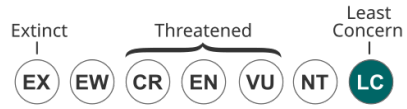
Fledging: 71–73 days after hatching (Schaffner, 1991). On Aldabra atoll, most birds left nest sites 70–80 days after hatching, and average age at first flight was 75 days (Stonehouse, 1962). Young disperse directly to sea without exercise periods or assistance from adults (Lee & Walsh-McGee, 2020).

Breeding success: On Ascension Island, Seychelles: 48.1% hatching success and 63% fledging success, combined success rate of 66.6% (Stonehouse, 1962). On Aldabra atoll: 43–50% fledging success (Diamond, 1975c), with maximum breeding success estimated at 46% (Prys-Jones & Peet, 1980). Greater failure during egg stage (51.9%) than chick stage (17.8%) (Stonehouse, 1962). Most chicks lost within first two weeks after hatching on Cousine Island, Seychelles: hatching success 58% and fledging success 43% (Malan *et al*., 2009).

Breeding cycle and interval: Breeding at 9- to 9.5-month intervals in tropics (Diamond, 1975c; Prys-Jones & Peet, 1980; Stonehouse, 1962).

6.1.13. Tropical Shearwater (Dhivehi hoagulha; *Puffinus bailloni*)

IUCN status: Least Concern



Global population estimate: 35,000 birds
Global population trend: STABLE

Table 11: Distribution of Tropical Shearwater (Dhivehi hoagulha; *Puffinus bailloni)* in the Maldives. Status: b = breeding; b? = breeding suspected; nb = non-breeding; - = absent/vagrant. Population: + = 1–10; ++ = 11–100; +++ = 101–1,000; ++++ = > 1,000 birds estimated; ? = no estimate. If breeding is occurring, no information on non-breeding status and population sizes is provided.

Area	Natural atoll	Administrative atoll	Status	Population
North	Ihavandhippolhu	HA.	b	?
	Thiladunmathi	HA. + HDh.	b	?
	Makunudhoo	HDh.	-	-
	Miladhunmadulu	Sh. + N.	-	-
	North Maalhosmadulu	R.	b?	?
	South Maalhosmadulu	B.	-	-
	Goifulhafehendhu	B.	-	-
	Faadhippolhu	Lh.	b	++
Central	Thoddu	AA.	-	-
	Ari	AA. + ADh.	b	++
	South Male	K.	-	-
	Felidhoo	V.	b	?
	North Nilandhoo	F.	-	-
	South Nilandhoo	Dh.	-	-
	Mulaku	M.	b	+
	Kolhumadulu	Th.	b	++
	Haddhunmathi	L.	b	++
South	Huvadhoo	GA. + GDh.	b	+++
	Fuvahmulah	Gn.	-	-
	Addu	S.	-	-

6.1.13.1.Situation in the Maldives

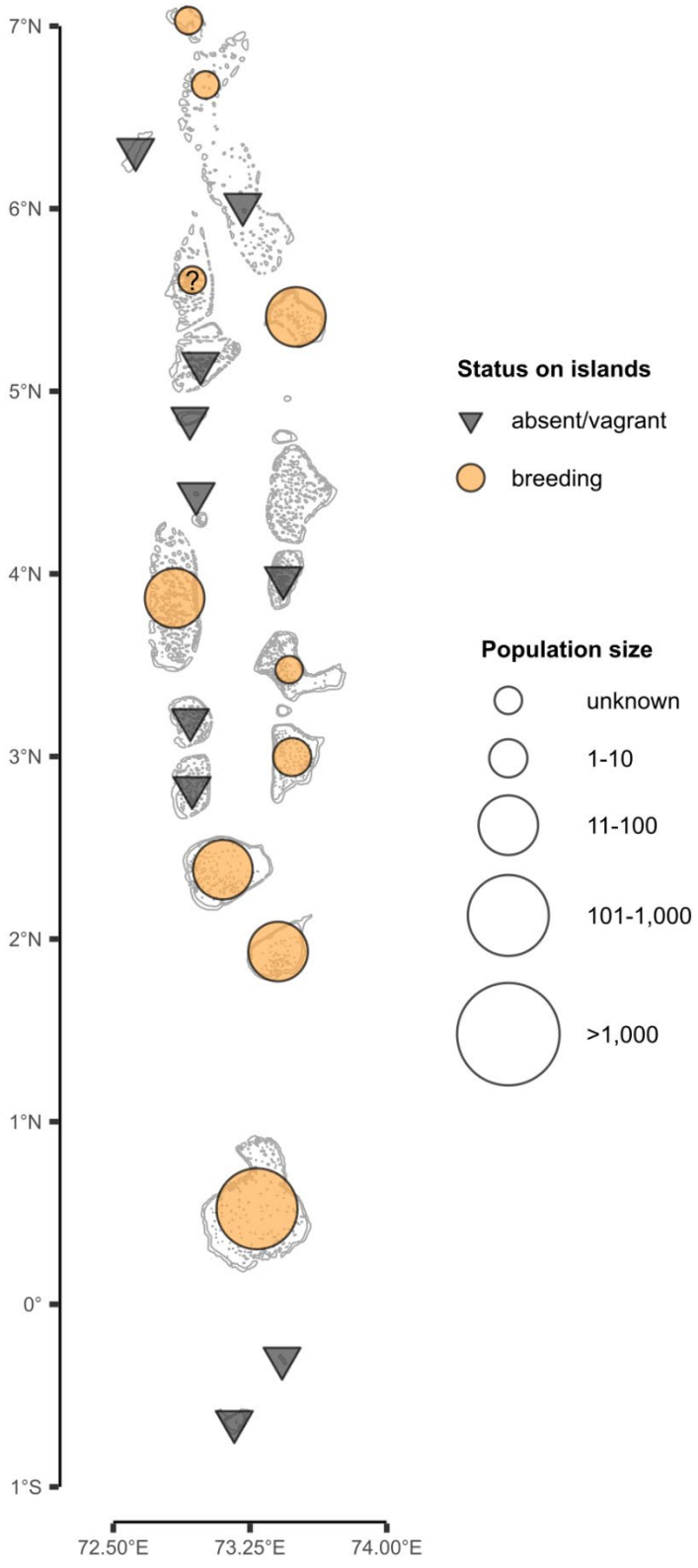
Tropical Shearwater (*Puffinus bailloni*) is a widely observed seabird in the Maldives (Figure 21), albeit mostly at sea outside the lagoon. The occurrence and abundance of Tropical Shearwater in the Maldives is mostly linked to the northeast monsoon season (Iruvai). It is generally known to be a good and reliable indicator for fishing grounds. Tropical Shearwater travel with tuna fishing vessels and stay near the boats. The species is known to return to islands particularly when raining. Tropical Shearwaters are poached for human consumption and for the pet-trade, with one interviewee stating a price of 5,000 MVR (ca. US$300) per bird. Many interviewees indicated breeding of Tropical Shearwater in the past on uninhabited islands, all of which have now been developed into resort islands.

Phillips (1964) reported the Tropical Shearwater as being observed in small numbers and breeding. Ash and Shafeeg (1994) considered Tropical Shearwater as a frequent and widespread visitor that was in decline and mentioned breeding throughout the Maldives.

6.1.13.2.Atoll-level summary

Northern Maldives
Ihavandhippolhu: breeding on HA. Govvaafushi.
Thiladunmathi: breeding on HDh. Kumundhoo, formerly also on HA. Kelaa. Outside the lagoon estimated 200–300 birds seen over schooling fish.
Makunudhoo: in the past breeding on HDh. Innafushi, estimated 200–300 birds seen over reefs about seven years ago. Nowadays only observed at sea inside and outside the lagoon.
Miladhunmadulu: in the past likely breeding on Sh. Gallaidhoo, Sh. Kudafarufinolhu, N. Orivaru and N. Randheli. Nowadays observed at sea mostly outside the lagoon, estimated up to 100 birds over schooling fish.
North Maalhosmadulu: potentially breeding on R. Lun'dhufushi. Observed at sea inside and outside the atoll in small numbers of no more than 1–2 birds.
South Maalhosmadulu: in the past breeding on B. Dhigufaruvinagan'du. Nowadays only observed at sea outside the lagoon, estimated 10–20 birds at a time.
Goifulhafehendhu: only observed at sea outside the lagoon.
Faadhippolhu: in the past breeding on Lh. Thilamaafushi. Nowadays mostly observed at sea outside the lagoon, with up to 100 birds when fishing is good. A small breeding colony established on Lh. Kurehdhoo, with 5–10 breeding pairs (Russell *et al*., 2024).

Central Maldives
Thoddu: in the past breeding in low numbers but now absent.
Ari: breeding on ADh. Ariyadhoo, ADh. Hukurudhoo and ADh. Huruelhi, estimated up to 50 birds. In the past also on ADh. Rangalifinolhu and ADh. Mandhoo.



South Male: in the past breeding on K. Biyaadhoo and K. Fihaalhohi. Nowadays only observed at sea outside the lagoon, estimated 40–100 birds when fishing is good.
Felidhoo: breeding on V. Fohtheyobodufushi and V. Bodumohoraa.
North Nilandhoo: in the past breeding on F. Bileiydhoo. Nowadays only observed at sea outside the lagoon, estimated 30–50 birds.
South Nilandhoo: in the past breeding widely on uninhabited islands. Nowadays only observed at sea outside the lagoon.
Mulaku: breeding in M. Gasveli and M. Dhekunuboduveli, estimated less than 10 birds.
Kolhumadulu: breeding on Th. Ruhthibirah and neighbouring islands, estimated 50–100 birds.
Haddhunmathi: breeding on L. Uvadhevifushi, estimated 50–100 birds.

Southern Maldives
Huvadhoo: breeding on GA. Hithaadhoo and GA. Hinaamaagalaa, estimated 100–1,000 birds.
Fuvahmulah: only historically seen on and around the island.
Addu: spotted at sea inside and outside the lagoon, estimated less than 10 birds. Birds also seen on the islands when attracted by light.

Figure 21: Distribution of Tropical Shearwater (Dhivehi hoagulha; *Puffinus bailloni*) in the Maldives. When breeding is occurring on an atoll, no information on roosting is provided. If only roosting is indicated, it means that no breeding is known to occur in the atoll.

6.1.13.3.Indian Ocean distribution

Breeding distribution:

In tropical Western Indian Ocean, Europa Island, Réunion, Aldabra, Seychelles, Chagos (Kirwan *et al*., 2020) (Figure 22).

Non-breeding distribution: Largely unknown. Adults considered to be largely sedentary in Seychelles and Réunion, staying within 80–300 km of breeding grounds. Immatures probably significantly more dispersive (Juhasz *et al*., 2022).

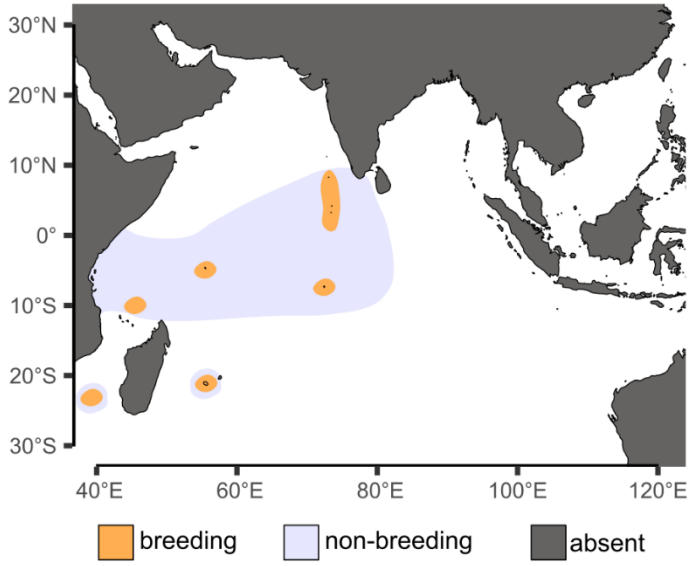


Figure 22: Indian Ocean-wide distribution map of Tropical Shearwater (Dhivehi hoagulha; *Puffinus bailloni*).

6.1.13.4.Breeding biology

Average clutch	Incubation	Fledge	Nest	Diet
1 egg	44–60 d	62–100 d	Burrows, rock crevices	Fish, squid, crustaceans

Timing: Réunion: breeding July to October (Bretagnolle *et al*., 2000; Safford & Hawkins, 2013). Seychelles: breeding year-round without pronounced breeding peak (Thibault & Bretagnolle, 1999). Chagos: breeding October to April (Carr, 2015).

Nest site: Breeds on volcanic islands and coral atolls (Kirwan *et al*., 2020). Nests in rock crevices or self-excavated burrows (0.6–2 m long), rarely also in hollow coconut palm stumps and under coconut detritus (Kirwan *et al*., 2020; Safford & Hawkins, 2013).

Clutch size: One egg per clutch (Kirwan *et al*., 2020).

Incubation period: 44–60 days (Brooke, 2004).

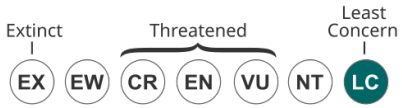
Fledging: 62–100 days after hatching, with mean fledging age at 75 days (Brooke, 2004).

Breeding success: Hatching success 48% and fledging success 68% on Aride Island, Seychelles (Safford & Hawkins, 2013).

Breeding cycle and interval: Sexual maturity achieved at ca. 8 years (Brooke, 2004).

6.1.14. Lesser/Great Frigatebirds (Hoara/ Maa Hoara; *Fregata ariel/minor*)

IUCN status: Least Concern (both species)



Global population estimate: 100,000–499,999 birds (Lesser Frigatebird)
120,000–750,000 birds (Great Frigatebird)

Global population trend: DECREASING (both species)

Table 12: Distribution of Frigatebirds (Hoara; *Fregata spp.*) in the Maldives. Status: b = breeding; b? = breeding suspected; nb = non-breeding; - = absent/vagrant. Population: + = 1–10; ++ = 11–100; +++ = 101–1,000; ++++ = > 1,000 birds estimated; ? = no estimate. If breeding occurs, no information on non-breeding status and population sizes is provided.

Area	Natural atoll	Administrative atoll	Status	Population
North	Ihavandhippolhu	HA.	nb	++
	Thiladunmathi	HA. + HDh.	-	-
	Makunudhoo	HDh.	-	-
	Miladhunmadulu	Sh. + N.	-	-
	North Maalhosmadulu	R.	-	-
	South Maalhosmadulu	B.	nb	?
	Goifulhafehendhu	B.	-	-
	Faadhippolhu	Lh.	-	-
Central	Thoddu	AA.	-	-
	Ari	AA. + ADh.	nb	?
	South Male	K.	-	-
	Felidhoo	V.	-	-
	North Nilandhoo	F.	-	-
	South Nilandhoo	Dh.	-	-
	Mulaku	M.	nb	+
	Kolhumadulu	Th.	-	-
	Haddhunmathi	L.	-	-
South	Huvadhoo	GA. + GDh.	nb	+++
	Fuvahmulah	Gn.	nb	+++
	Addu	S.	-	-

6.1.14.1.Situation in the Maldives (both species combined)

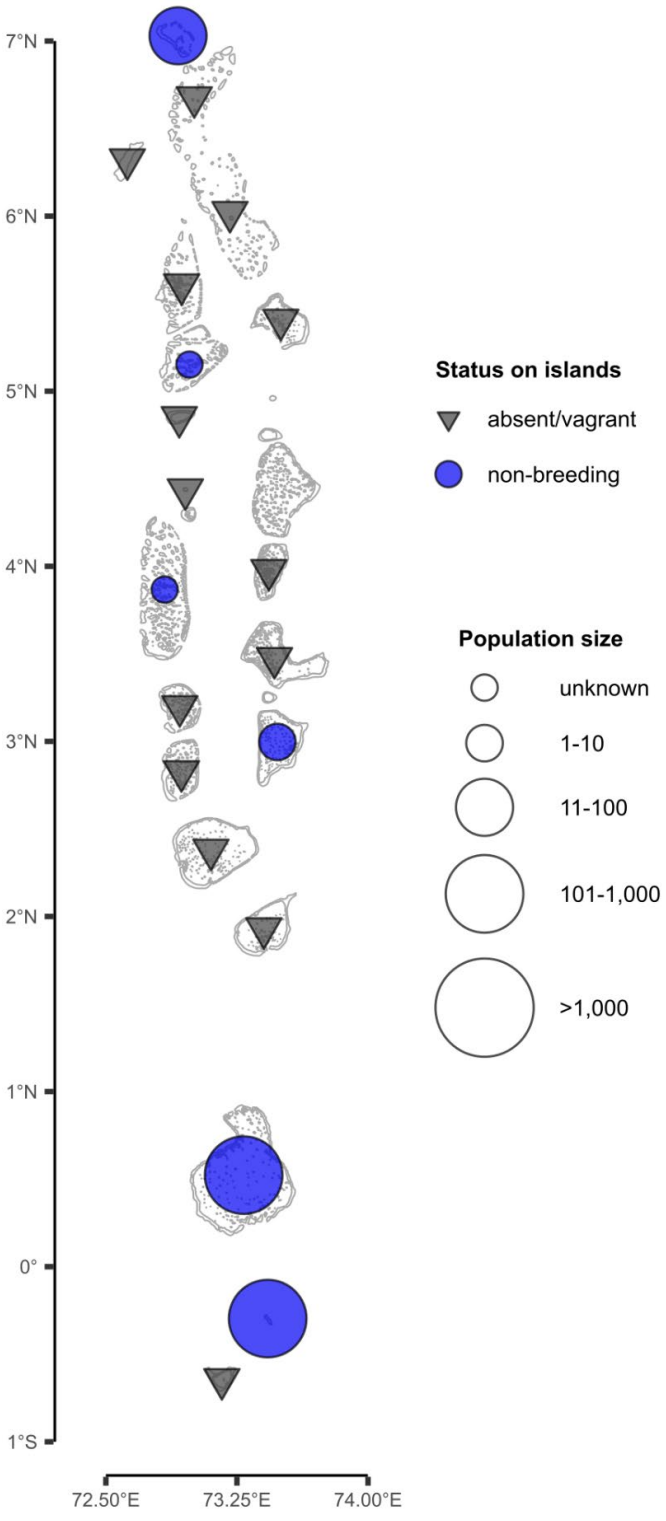
Frigatebirds (Hoara; *Fregata minor/ariel*) in the Maldives are usually seen only far offshore, sometimes over 100 miles outside the lagoons. Their occurrence is linked to the northeast monsoon season (Iruvai) when hundreds to thousands migrate to the Maldivian waters. Traditional ecological knowledge links the presence of frigatebirds to the flying-fish season. Roosting is confined to a few islands in Southern Maalhosmadulu atoll and the southern atolls (Figure 23).

Interviewees stated that the presence of Pisonia trees (Lhos gas; *Pisonia grandis*) is a prerequisite for frigatebird roosting. On Mulaku atoll, birds come to the islands during heavy rains. The seamount between Haddhunmathi and Huvadhoo atolls (Satho Raha Thila) is an important offshore feeding ground for frigatebirds. Tracking studies revealed that Great Frigatebirds (*Fregata minor*) breeding on Europa Island, Mozambique Channel, visit the Maldivian waters and roost on GA. Hithaadhoo, travelling over 4,400 km (Weimerskirch *et al*., 2017; Weimerskirch *et al*., 2006). Frigatebirds are commonly poached to keep as pets.

Phillips (1964) considered Great Frigatebird as a frequent visitor to Addu atoll, and as being observed in small numbers in other atolls. Lesser Frigatebird (*Fregata ariel*) was reported as plentiful around most atolls, but resident only in some atolls, while breeding was confined to South Maalhosmadulu atoll. Ash and Shafeeg (1994) reported Great Frigatebird as a frequent visitor throughout the Maldives. Lesser Frigatebird was considered widespread, abundant, and breeding.

6.1.14.2. Atoll-level summary

Northern Maldives
Ihavandhippolhu: occasionally roosting on HA. Gallandhoo, estimated 50 birds.
Thiladunmathi: only observed at sea outside the lagoon, estimated several 100 birds.
Makunudhoo: only at sea outside the lagoon, no more than 1–2 birds at a time.
Miladhunmadulu: only at sea outside the lagoon, no more than 5–8 birds at a time.
North Maalhosmadulu: only at sea outside the lagoon, no more than 3–4 birds at a time.
South Maalhosmadulu: roosting on B. Olhugiri.
Goifulhafehendhu: only at sea inside and outside the lagoon, estimated 50–60 birds.
Faadhippolhu: very rarely seen at sea outside the lagoon, no more than 1–2 birds at a time.



Central Maldives

Thoddu: only at sea inside and outside the lagoon, more than 10 birds. Formerly more abundant.

Ari: occasionally reported seen roosting on palm trees. Mostly at sea outside the lagoon, estimated 6–30 birds.

South Male: only at sea outside the lagoon, no more than 1–2 birds at a time.

Felidhoo: only at sea outside the lagoon, no more than single birds occasionally observed.

North Nilandhoo: only at sea outside the lagoon, no more than 1–4 birds at a time.

South Nilandhoo: only at sea outside the lagoon, no more than 2–3 birds at a time.

Mulaku: roosting on M. Gasveli and M. Dhekunuboduveli, estimated 2–4 birds.

Kolhumadulu: only at sea outside the lagoon, sometimes 6–10 birds but usually no more than 1–2 birds at a time.

Haddhunmathi: only at sea outside the lagoon, no more than 7–8 birds at a time.

Southern Maldives

Huvadhoo: roosting on GA. Hithaadhoo, estimated 100–200 birds.

Fuvahmulah: roosting in palm trees, estimated over 100–300 birds, in some seasons over 1,000 birds.

Addu: only at sea inside and outside the lagoon, mostly around Addu Nature Park near Eedhigali Kilhi wetland, S. Gan, and S. Hankede, estimated 50–100 birds.

Figure 23: Distribution of Frigatebirds (Hoara; *Fregata ariel/minor*) in the Maldives. When breeding is occurring on an atoll, no information on roosting is provided. If only roosting is indicated, it means that no breeding is known to occur in the atoll.

6.1.14.3. Indian Ocean distribution: Lesser Frigatebird (*Fregata ariel*)

Breeding distribution:

Aldabra atoll, Seychelles, Chagos, Northern Australia, Cocos-Keeling atoll (Orta *et al*., 2020) (Figure 24).

Non-breeding distribution: Largely unknown. Dispersal of immatures and non-breeders throughout tropical seas, birds follow prevailing winds. Some birds from Pacific colonies migrate into Eastern Indian Ocean during non-breeding periods (Orta *et al*., 2020).

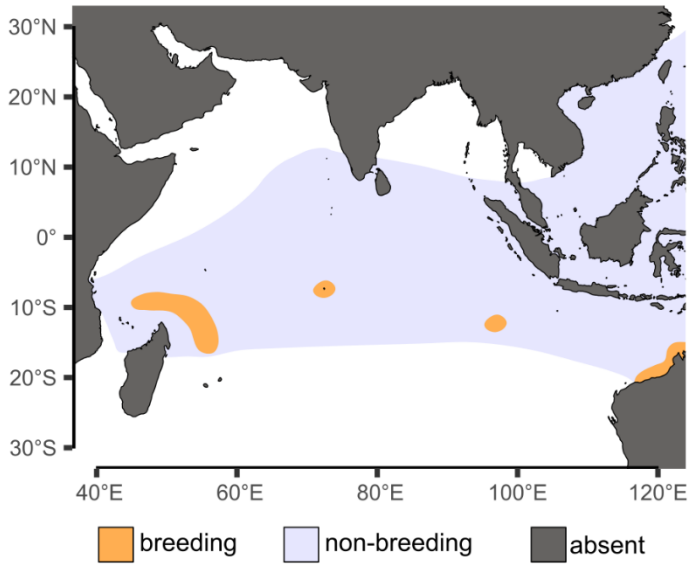


Figure 24: Indian Ocean-wide distribution map of Lesser Frigatebird (Hoara; *Fregata ariel*).

6.1.14.4. Indian Ocean distribution: Great Frigatebird (*Fregata minor*)

Breeding distribution:

Aldabra atoll, Tromelin Island, St. Brandon, Cocos-Keeling atoll, Christmas Island, Mauritius. Historically also breeding in Inner Seychelles (Gauger Metz & Schreiber, 2020) (Figure 25).

Non-breeding distribution: Largely unknown. At most breeding locations, number of birds declines greatly during non-breeding period, but at some locations, numbers remain similar throughout year (although different individuals may be present). After breeding, most adults probably spread out from colony and spend more time at sea. Do not need to come to land to roost but will if island is available (Gauger Metz & Schreiber, 2020).

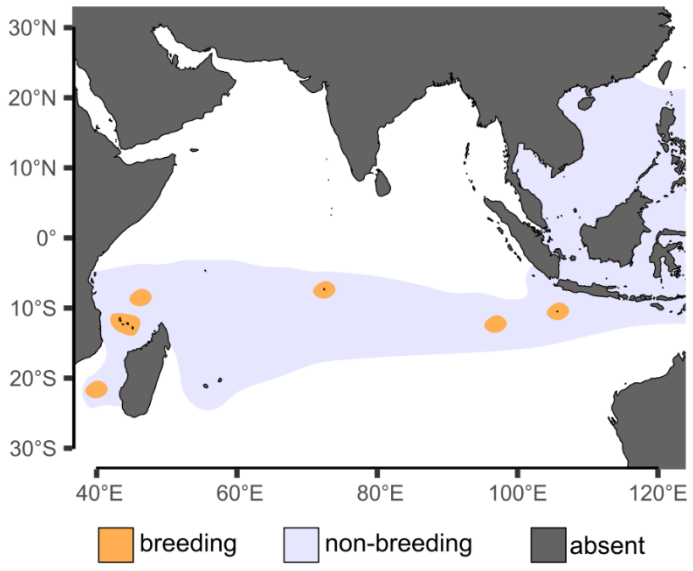


Figure 25: Indian Ocean-wide distribution map of Great Frigatebird (Maa Hoara; *Fregata ariel*).

6.1.14.5. Breeding biology: Lesser Frigatebird (*Fregata ariel*)

Average clutch	Incubation	Fledge	Nest	Diet
1 egg	45 d	20–24 weeks	Shrubs, mangroves, broadleaf trees, ground	Fish, squid

Timing: No pronounced season but varying peaks in different colonies likely due to prey availability (Orta *et al*., 2020).

Nest site: In shrubs, mangroves, and broadleaf trees up to 15 m high but also observed to nest on ground. Nest built from twigs (Orta *et al*., 2020).

Clutch size: One egg per clutch (Orta *et al*., 2020).

Incubation period: Average 45 days (Orta *et al*., 2020).

Fledging: 20–24 weeks after hatching (Orta *et al*., 2020). Post-fledging care extending 4–6 months (Orta *et al*., 2020).

Breeding success: Reproductive success (eggs to fledging) 12% on Aldabra atoll (Orta *et al*., 2020).

Breeding cycle and interval: Probably breeding every two years. Age of sexual maturity unknown (Orta *et al*., 2020).

6.1.14.6. Breeding biology: Great Frigatebird (*Fregata minor*)

Average clutch	Incubation	Fledge	Nest	Diet
1 egg	55 d	10–16 months	Low shrub vegetation, mangroves, trees	Fish, squid

Timing: On Christmas Island: breeding March to May (Nelson, 1975). On Aldabra atoll: breeding August to September (Nelson, 1975). Seasonality may be controlled by food availability (Nelson, 1977).

Nest site: Nesting on top of low shrub vegetation, mangroves, and broadleaf trees, sometimes also on mats of grassy vegetation (Gauger Metz & Schreiber, 2020). Breeding colonies typically sheltered from strong prevailing winds (Diamond, 1975b). Nest built from twigs, vines, leaves, and material floating on ocean. Average nesting height only 0.5 m above ground (Gauger Metz & Schreiber, 2020). As breeding cycle is only every two years, nest site fidelity appears to be low as site is often claimed by another pair in interim (Nelson, 1983).

Clutch size: One egg per clutch, sometimes observed re-laying when egg failed early (Gauger Metz & Schreiber, 2020).

Incubation period: Average 55 days (Gauger Metz & Schreiber, 2020).

Fledging: Fledglings gradually spend more time away from nest and dispersing at 10–16 months old (Gauger Metz & Schreiber, 2020).

Breeding success: Reproductive success (eggs to fledgling) 60–70% on Johnston atoll (Schreiber, 1996), but entire colony failure and abandonment during El Niño years (Schreiber & Schreiber, 1984). 10–83% reproductive success (eggs to fledgling) on Aldabra atoll (Diamond, 1975a; Diamond, 1975b), with first-time breeders considered to be less successful than older birds (Gauger Metz & Schreiber, 2020).

Breeding cycle and interval: One chick raised every two years, some breeding less frequently (Nelson, 1977). Breeding considered to commence at age five (Gauger Metz & Schreiber, 2020).

6.2. Herons and allies (flamingos, spoonbills, ibises)

6.2.1. Overview

Herons and allies are a group of bird species that are all aquatic predators adapted to hunting in the shallow waters of wetlands and coasts but also found in open fields and grasslands (Kushlan & Hancock, 2005). In the Maldives, the herons-and-allies guild comprises herons (Ardeidae), flamingos (Phoenicopteridae), spoonbills and ibises (both Threskiornithidae). Their long beaks are used either as a dagger to stab prey, or to stir up the bottom to dislodge prey items (Kushlan & Hancock, 2005). Despite their striking appearance, herons and allies nest only in sheltered and remote sites, often very secretively (Kushlan & Hancock, 2005).

A total of 17 species of herons and allies are protected under EPA regulation in the Maldives (Table 13). Of these, five breed in the Maldives (including one tentatively), while the other 12 only migrate seasonally or infrequently to the Maldives during non-breeding season. Most prominent is the Eastern Cattle-egret (*Ardea coromanda*), whose Dhivehi name ('Iruvaihudhu') references the north-eastern monsoon season 'Iruvai' (December to April), and 'hudhu' translating to 'white' in reference to its all-white non-breeding plumage during its seasonal overwintering in the Maldives.

Five heron-and-allies species are considered to be widespread in the Maldives, four occur localised on just a few atoll islands (mostly in the south), and for eight their occurrence is not resolved. Anderson and Shimal (2020) list four species as common in the Maldives, five as uncommon, six as rarely occurring, one as only occurring as a vagrant, and an unknown status for one species. Due to some anecdotal information by locals that the Greater Flamingo (*Phoenicopterus roseus*) may be breeding in wetlands, it was included as a short-listed species to this report, although our assessment could not verify these accounts.

Table 13: Heron and allies in the Maldives. Status in the Maldives based on Anderson and Shimal (2020). Green cells indicate where birds met the shortlisting criteria, and detailed species-level assessment data was obtained by interviews. Based on a short-listing by breeding status, distribution, and occurrence within the Maldives, a detailed assessment of ten heron and allies in the Maldives was conducted through the interview process. LC = Least Concern.

English name	Dhivehi name	IUCN status	Breeding status	Distribution status	Occurrence status
Grey Heron	Alhi maakanaa	LC	Yes	Widespread	Common
Striated Heron	Dhivehi raabondhi	LC	Yes	Widespread	Common
Cinnamon Bittern	Kuda raabondhi	LC	Yes	Localised	Uncommon

English name	Dhivehi name	IUCN status	Breeding status	Distribution status	Occurrence status
Yellow Bittern	Dhon raabondhi	LC	Yes	Localised	Uncommon
Black-crowned Night-heron	Raabondhi	LC	Yes (?)	Localised	Uncommon
Indian Pond-heron	Huvadhoo raabondhi	LC	No	Widespread	Common
Eastern Cattle-egret	Iruvaihudhu	LC	No	Widespread	Common
Little Egret	Kuda lagana	LC	No	Widespread	Uncommon
Great Egret	Lagana	LC	No	Localised	Uncommon
Greater Flamingo	Gudugudaa dhooni	LC	No (?)	?	Rare
Western Reef-heron	Bondu raabondhi	LC	No	?	Vagrant
Purple Heron	Dhanbu maakanaa	LC	No	?	Rare
Eurasian Bittern	Ran raabondhi	LC	No	?	Rare
Black Bittern	Kalhu raabondhi	LC	No	?	Rare
Eurasian Spoonbill	Dheyfaiy dhooni	LC	No	?	Rare
Glossy Ibis	Kalhu bulhithumbi	LC	No	?	Rare
Black-headed Heron	-	LC	No	?	?

6.2.2. Ecological background

6.2.2.1. General breeding and non-breeding habitat of heron and allies

Herons and allies are commonly found in tropical regions, where they rely on a mix of wetland habitats for breeding and non-breeding purposes (Kushlan & Hancock, 2005). During the breeding season, they gather in colonies, often called rookeries, located in trees, shrubs, or tall reeds near water (Kushlan & Hancock, 2005). These colonies are usually established in areas that offer safety from predators, such as small islands, flooded forests, or dense mangroves (Kushlan & Hancock, 2005). Breeding sites are typically close to shallow water bodies, such as ponds, marshes, or riverbanks, where food is abundant for raising chicks. The nests, built with sticks and vegetation, are carefully constructed to protect eggs and young birds (Kushlan & Hancock, 2005).

In the non-breeding season, herons and allies disperse more widely and can be found in a variety of aquatic habitats, including tidal flats, estuaries, coastal habitats, and rice fields (Kushlan & Hancock, 2005). These habitats provide feeding opportunities as these birds rely on small fish, crustaceans, insects, and amphibians.

Herons and allies are highly adaptable and will often forage in temporary wetlands created by seasonal rains or human activities (Kushlan & Hancock, 2005).

While herons and allies depend heavily on wetlands, they are also seen near urban areas, such as parks or canals, demonstrating their ability to adapt to changing environments so long as food and water are available (Kushlan & Hancock, 2005).

6.2.2.2. General migration patterns and timing of herons and allies

Herons and allies in the tropics generally show flexible migration patterns that depend on the availability of food and suitable wetland habitats. Herons often do not undertake long-distance migrations (Kushlan & Hancock, 2005). Instead, they exhibit shorter seasonal movements, sometimes referred to as nomadic or opportunistic migrations, to track changes in water levels and food resources (Kushlan & Hancock, 2005).

During the rainy season, herons and allies may move to newly flooded wetlands, rice fields, or marshes where fish, amphibians, and aquatic insects are abundant (Kushlan & Hancock, 2005). These areas provide ideal feeding grounds and nesting opportunities. Once the rainy season ends and wetlands dry up, they may shift to more permanent water bodies, such as rivers, estuaries, or coastal lagoons, where they can continue to find food (Kushlan & Hancock, 2005).

In tropical regions, herons and allies tend to remain within their general range throughout the year, though some species, like the Eastern Cattle-egret, are known for more extensive movements (Hancock & Kushlan, 1984). For example, Eastern Cattle-egrets have been observed moving between tropical Africa and parts of Asia, following the availability of food and breeding opportunities (Hancock & Kushlan, 1984).

6.2.2.3. General diet of herons and allies

Herons and allies have a diet that primarily consists of small aquatic animals, and they are skilled hunters in wetland environments (Kushlan & Hancock, 2005). The diet of herons and allies mainly includes fish, which they catch with their long, sharp bills. Herons and allies use different hunting techniques depending on the habitat (Kushlan & Hancock, 2005). They may stand motionless to ambush prey, wade through water to flush out fish, or even stir the mud with their feet to uncover hidden food (Kushlan & Hancock, 2005). Flamingos generally skim the water to filter for insect larvae and planktonic crabs (Johnson & Cézilly 2007). Herons and allies are also known to feed on frogs, crabs, shrimp, and aquatic insects found in shallow water or along muddy shores.

Herons and allies are opportunistic feeders, which means they adapt their diet based on what is available in their environment. In flooded rice fields or temporary

wetlands, herons and allies often hunt for small rodents or reptiles in addition to their usual aquatic prey (Kushlan & Hancock, 2005). Some, like cattle-egrets, have specialized feeding habits and often follow livestock, catching insects stirred up by grazing animals (Siegfried, 1971).

6.2.2.4. General monitoring methods for herons and allies

A common approach for population censusing is counting birds in their colonies during the breeding season. Nesting sites are visited to record the number of nests and chicks, which provides important information about population sizes and reproductive success (Kushlan, 2011). This is often done from a distance using binoculars or spotting scopes to avoid disturbing the birds.

Monitoring herons and allies also involves studying their habitats. Scientists survey wetlands to assess water quality, the availability of prey, and threats like pollution or habitat loss. In some cases, remote cameras are placed near nests to observe behaviour (Khandu *et al*., 2022). Drones can be used to map colonies and count birds in hard-to-reach areas (Valle & Scarton, 2022). Early-morning call counts can be used to count the number of male bittern territories (Lor & Malecki, 2002).

6.2.2.5. General threats to herons and allies

A major issue is the loss and degradation of wetland habitats (Quesnelle *et al*., 2013). Wetlands, where these birds breed, feed, and roost, are often drained for agriculture or urban development, reducing the space available for these species (Quesnelle *et al*., 2013). Pollution, particularly from chemicals and waste, can also contaminate their habitats, poisoning both the birds and their food sources (Ohlendorf *et al*., 1978).

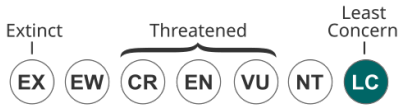
Another significant threat is disturbance from human activities. In areas where herons and allies nest in large colonies, disturbances from tourism, fishing, or hunting can cause stress, leading to abandonment of nests or even the destruction of entire colonies (Fasola *et al*., 2010; Mohd-Taib *et al*., 2020).

Climate change is another growing concern. Increasing temperatures and altered rainfall patterns can affect the availability of food and nesting sites (Tuohetahong *et al*., 2024). Extreme weather events, such as storms and floods, can damage nesting colonies and disrupt the breeding cycle, while droughts can dry out wetland habitat (Kelly & Condeso, 2014; Wen *et al*., 2016).

Finally, hunting and illegal trade also pose risks (Kushlan, 2018). In some areas, herons and allies are captured for their feathers or sold as exotic pets (Kushlan, 2018).

6.2.3. Greater Flamingo (Gudugudaa dhooni; *Phoenicopterus roseus*)

IUCN status: Least Concern



Global population estimate: 550,000–680,000 birds
Global population trend: INCREASING

Table 14: Distribution of Greater Flamingo (Gudugudaa dhooni; *Phoenicopterus roseus*) in the Maldives. Status: b = breeding; b? = breeding suspected; nb = non-breeding; - = absent/vagrant. If breeding is occurring, no information on non-breeding status is provided.

Area	Natural atoll	Administrative atoll	Status
North	Ihavandhippolhu	HA.	-
	Thiladunmathi	HA. + HDh.	nb
	Makunudhoo	HDh.	nb
	Miladhunmadulu	Sh. + N.	nb
	North Maalhosmadulu	R.	nb
	South Maalhosmadulu	B.	-
	Goifulhafehendhu	B.	-
	Faadhippolhu	Lh.	nb
Central	Thoddu	AA.	-
	Ari	AA. + ADh.	-
	South Male	K.	-
	Felidhoo	V.	-
	North Nilandhoo	F.	-
	South Nilandhoo	Dh.	-
	Mulaku	M.	-
	Kolhumadulu	Th.	-
	Haddhunmathi	L.	-
South	Huvadhoo	GA. + GDh.	-
	Fuvahmulah	Gn.	-
	Addu	S.	-

6.2.3.1. Situation in the Maldives

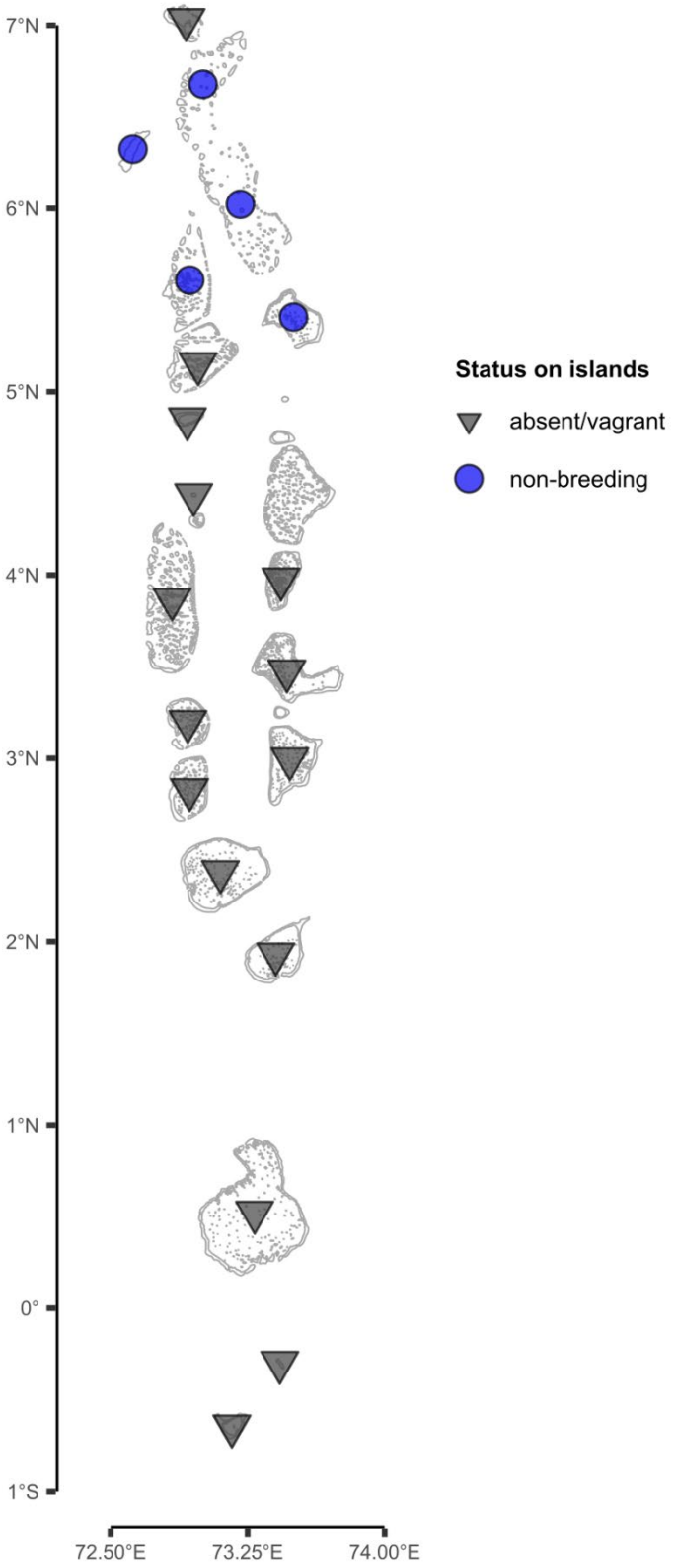
The occurrence of Greater Flamingo (*Phoenicopterus roseus*) in the Maldives is generally linked to the beginning of the northeast monsoon season (Iruvai) during the times of rough seas and strong winds of the Furahalha and Uthura-Halha nakaiy (23 December – 18 January). Greater Flamingos are known to be staying in low numbers in the wetland areas in the northern atolls (Figure 26). Nevertheless, the presence of Greater Flamingos in the Maldivian wetlands appears to be only infrequent, but some interviewees indicated that Greater Flamingos were more regularly observed in the past (20–30 years ago).

Phillips (1964) made no mention of Greater Flamingos. Ash and Shafeeg (1994) reported Greater Flamingo as sporadically visiting but well-established in Maldivian folklore.

6.2.3.2. Atoll-level summary

Northern Maldives
Ihavandhippolhu: not observed.
Thiladunmathi: seasonally observed in HA. Kelaa mangrove wetlands and taro fields (15 birds) and in the wetlands of HDh. Kulhudhuffushi (2–4 birds), also occasionally on HA. Filladhoo and HA. Dhapparuhuraa.
Makunudhoo: observed once (4 birds).
Miladhunmadulu: seasonally observed on Sh. Funadhoo (2 birds). Not observed in the southern parts (N.) of the atoll.
North Maalhosmadulu: seasonally observed on R. Un'goofaaru (2–4 birds once), last seen in 2023.
South Maalhosmadulu: not observed.
Goifulhafehendhu: not observed.
Faadhippolhu: seasonally observed in the wetlands of Lh. Hudhufushi (1–2 birds).

Central Maldives
Thoddu: not observed.
Ari: observed in the past, ca. 30 years ago.
South Male: not observed.
Felidhoo: not observed.
North Nilandhoo: not observed.
South Nilandhoo: not observed.
Mulaku: not observed.
Kolhumadulu: not observed.
Haddhunmathi: not observed.



Southern Maldives
Huvadhoo: seen about 20–30 years ago, usually 1–2 birds seen in the shallow seagrass beds and taro fields. Not observed anymore.
Fuvahmulah: not observed.
Addu: seen in Addu Nature Park area 10–20 years ago and S. Herathera. Not observed anymore.

Figure 26: Distribution of Greater Flamingo (Guduguda dhooni; *Phoenicopterus roseus*) in the Maldives. When breeding is occurring on an atoll, no information on roosting is provided. If only roosting is indicated, it means that no breeding is known to occur in the atoll.

6.2.3.3. Indian Ocean distribution

Breeding distribution:

In Asia, breeds in lakes in Iran, Iraq, Syria, Kuwait, United Arab Emirates, Yemen, Afghanistan, India. Also, along river Nile in Africa, Kenya, Madagascar (Salvador *et al*., 2024) (Figure 27).

Non-breeding distribution: Overwinters in Saudi Araba, United Arab Emirates, Yemen, Omar, Qatar, Iraq, Afghanistan, India, Bangladesh, Sri Lanka. Usually overwinters in coastal wetlands, including lagoons, marshes, intertidal wetlands. Middle Eastern and European populations migrate to Africa and Arabian Peninsula (Salvador *et al*., 2024).

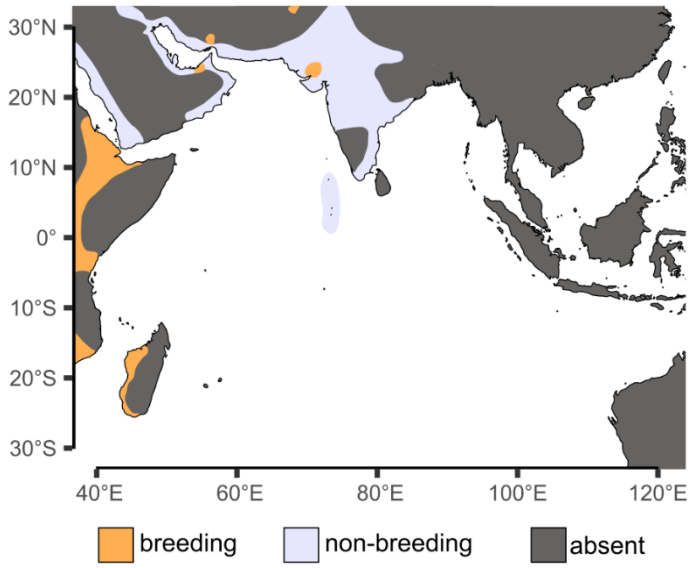


Figure 27: Indian Ocean-wide distribution map of Greater Flamingo (Guduguda dhooni; *Phoenicopterus roseus*).

6.2.3.4. Breeding biology

Average clutch	Incubation	Fledge	Nest	Diet
1 egg	27–36 d	71–98 d	Muddy to sandy substrates; shallow wetlands	Crustaceans, molluscs, aquatic insects, annelids, microalgae, plant seeds

Timing: Breeding closely related to rainfall during the months preceding egg-laying, which likely drives food availability (Salvador *et al*., 2024). A minimum amount of precipitation is known to be needed to trigger breeding in several locations (Salvador *et al*., 2024). In Indian colonies, breeding is tied to monsoon seasons, i.e. July to October (McCann, 1939). East African breeding populations mainly sedentary (Salvador *et al*., 2024). Populations in Northern Iran known to migrate to Arabian Peninsula, Pakistan, India, Sri Lanka (Johnson & Cézilly 2007).

Nest site: Nests usually on muddy to sandy substrates, where mud is scraped to construct a mound nest that is elevated above ground level to prevent flooding (Salvador *et al*., 2024). Generally, in shallow (<1 m deep) open wetlands, usually in saline or alkaline waters, such as in salt lakes, salt pans, coastal lagoons, intertidal mudflats, coastal islets (Johnson & Cézilly 2007).

Clutch size: 1 egg per clutch (Salvador *et al*., 2024).

Incubation period: 27–36 days (Salvador *et al*., 2024).

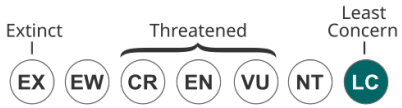
Fledging: Chicks begin leaving nest at 7–10 days after hatching, but fledging occurs only 71–98 days after hatching (Salvador *et al*., 2024). Chicks leave breeding sites 80–139 days after hatching (Salvador *et al*., 2024).

Breeding success: 70% hatching success at colony in Spain (Picazo, 2018, 2020). 18–88% hatching success at colony in Kenya (Brown *et al*., 1973). 77% hatching success at colony in Botswana (McCulloch & Irvine, 2004). Variability in hatching success between years and colonies due to abandonment of nests caused by predator disturbance, adverse weather, human disturbance (Salvador *et al*., 2024).

Breeding cycle and interval: One brood per season, but re-laying occurs when brood fails early (Salvador *et al*., 2024). Sexual maturity at age three, but most birds are age 4–8 when they first breed (Johnson & Cézilly 2007).

6.2.4. Cinnamon Bittern (Kuda raabondhi; *Botaurus cinnamomeus*)

IUCN status: Least Concern



Global population estimate: 83,300–1,330,000 birds
Global population trend: UNKNOWN

Table 15: Distribution of Cinnamon Bittern (Kuda raabondhi; *Botaurus cinnamomeus*) in the Maldives. Status: b = breeding; b? = breeding suspected; nb = non-breeding; - = absent/vagrant. If breeding is occurring, no information on non-breeding status is provided.

Area	Natural atoll	Administrative atoll	Status
North	Ihavandhippolhu	HA.	-
	Thiladunmathi	HA. + HDh.	-
	Makunudhoo	HDh.	-
	Miladhunmadulu	Sh. + N.	-
	North Maalhosmadulu	R.	-
	South Maalhosmadulu	B.	-
	Goifulhafehendhu	B.	-
	Faadhippolhu	Lh.	-
Central	Thoddu	AA.	-
	Ari	AA. + ADh.	-
	South Male	K.	-
	Felidhoo	V.	-
	North Nilandhoo	F.	-
	South Nilandhoo	Dh.	b?
	Mulaku	M.	-
	Kolhumadulu	Th.	-
	Haddhunmathi	L.	-
South	Huvadhoo	GA. + GDh.	-
	Fuvahmulah	Gn.	b
	Addu	S.	-

6.2.4.1. Situation in the Maldives

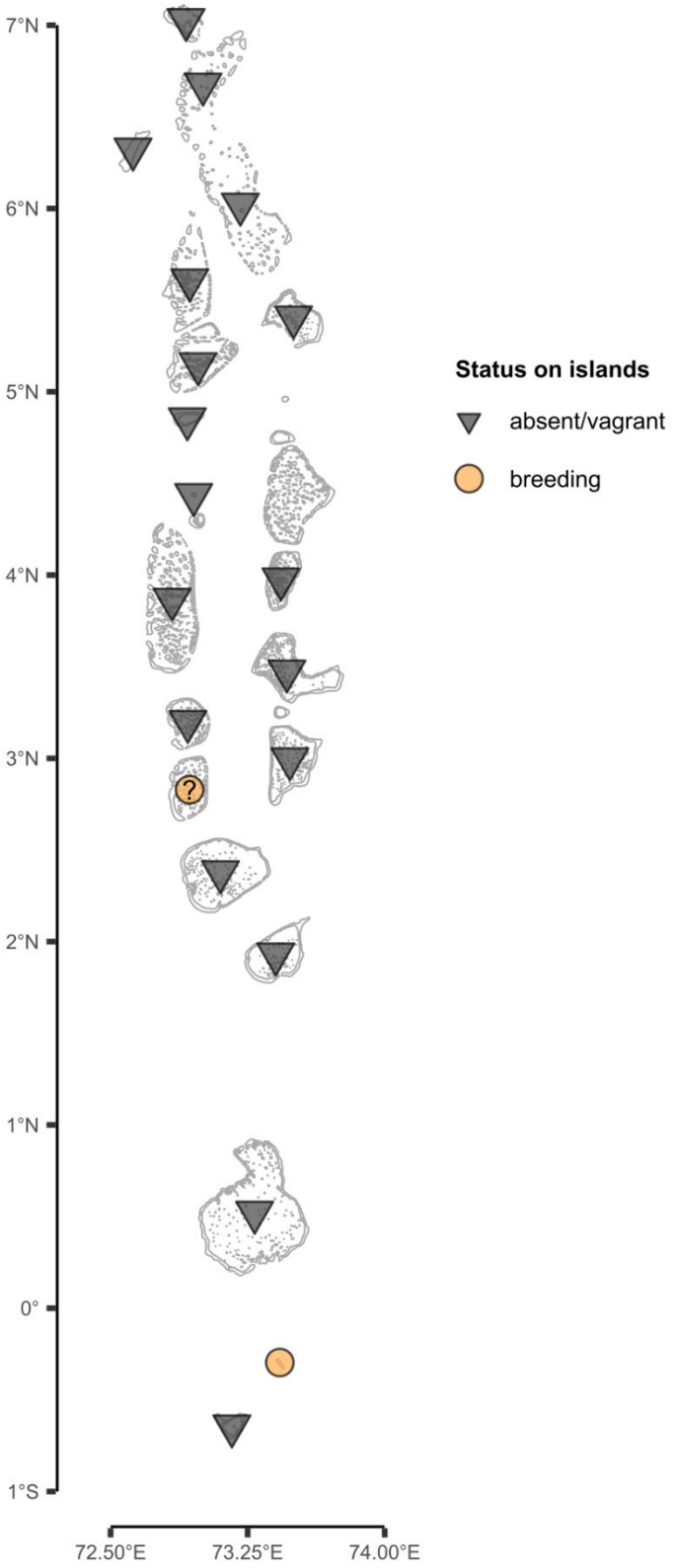
Over wide parts of the Maldives, the Cinnamon Bittern is a rare straggler (Figure 28) and only observed infrequently in some years, with some interviewees indicating they last observed a bird 10–30 years ago. The occurrence of Cinnamon Bittern is linked to Hey, Vihaa, and Dosha nakaiys (18 October to 9 December), the last nakaiy of the southwest monsoon season (Hulhangu), but birds are disappearing before the beginning of Mula nakaiy (starting 10 December), the first nakaiy of the northeast monsoon season (Iruvai). In the wetland areas on Fuvahmulah atoll, the Cinnamon Bittern is breeding in low numbers.

Phillips (1964) reported the status of Cinnamon Bittern in the Maldives as uncertain, but likely as an occasional visitor. Ash and Shafeeg (1994) considered the Cinnamon Bittern as an occasional visitor.

6.2.4.2. Atoll-level summary

Northern Maldives
Ihavandhippolhu: not observed.
Thiladunmathi: not observed.
Makunudhoo: infrequently observed.
Miladhunmadulu: infrequently observed. Formerly more abundant.
North Maalhosmadulu: not observed. During Iruvai an estimated 10–12 birds were observed.
South Maalhosmadulu: not observed.
Goifulhafehendhu: only once observed about 10 years ago.
Faadhippolhu: infrequently observed.

Central Maldives
Thoddu: not observed.
Ari: infrequently observed.
South Male: infrequently observed.
Felidhoo: not observed.
North Nilandhoo: not observed.
South Nilandhoo: infrequently observed. Tentatively breeding in low numbers. Formerly more abundant.
Mulaku: not observed.
Kolhumadulu: infrequently observed.
Haddhunmathi: infrequently observed.



Southern Maldives
Huvadhoo: not observed in northern parts (GA.), infrequently observed in the southern parts (GDh.) of the atoll.
Fuvahmulah: breeding in low numbers in UNESCO wetland areas.
Addu: estimated 2–3 birds observed as vagrants in the wetland area at Addu Equatorial Hospital, S. Hithadhoo.

Figure 28: Distribution of Cinnamon Bittern (Kuda raabondhi; *Botaurus cinnamomeus*) in the Maldives. When breeding is occurring on an atoll, no information on roosting is provided. If only roosting is indicated, it means that no breeding is known to occur in the atoll.

6.2.4.3. Indian Ocean distribution

Breeding distribution:

Along coasts of Indian subcontinent, Sri Lanka, China, Taiwan, south-east Asia, Indomalayan region, Philippines, Andaman and Nicobar Islands, small breeding population in Fuvahmulah, Southern Maldives (Martínez-Vilalta *et al*., 2024a) (Figure 29).

Non-breeding distribution:

Northern populations spend non-breeding season in south of the breeding range, apparently following rainfall and high-water levels of monsoon periods. Southern populations considered to be sedentary (Martínez-Vilalta *et al*., 2024a).

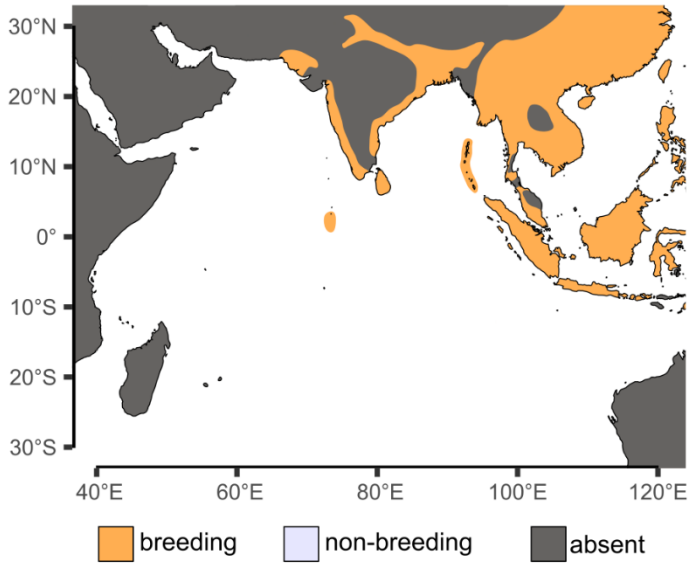


Figure 29: Indian Ocean-wide distribution map of Cinnamon Bittern (Kuda raabondhi; *Botaurus cinnamomeus*).

6.2.4.4. Breeding biology

Average clutch	Incubation	Fledge	Nest	Diet
3–5 eggs	23 d	10 d	Grassy areas, wetlands, reed marshes, flooded rice fields	Fish, amphibians, insects

Timing: Varies with location, generally considered to be synchronised with monsoons. India: breeding June to September (Martínez-Vilalta *et al*., 2024a). Sumatra: breeding January to March (Martínez-Vilalta *et al*., 2024a), Thai-Malay peninsula: breeding September, December, and February to July (Martínez-Vilalta *et al*., 2024a). Java: breeding October to June (Martínez-Vilalta *et al*., 2024a). Borneo: breeding June, August, and December (van Balen *et al*., 2011). Philippines: breeding July to August (Kennedy, 2000).

Nest site: Breeds in small groups, sometimes in loose association with other heron species (Kushlan & Hancock, 2005). Breeding habitat are mostly grassy areas, wetlands, reed marshes, or flooded rice fields (Kushlan & Hancock, 2005). Nests on flattened clumps of reeds, in grass tussocks, or in trees and bushes (Kushlan & Hancock, 2005). Nest usually 0–1 m above ground, usually above water (Kushlan & Hancock, 2005). Nest is a small platform of small twigs, reeds, sedges, often lined with leaves (e.g. *Pandanus*) and fine grass (Kushlan & Hancock, 2005).

Clutch size: 3–5 eggs per clutch, laid at one-day intervals (Wells, 1999).

Incubation period: 23 days (Wells, 1999).

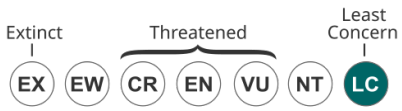
Fledging: At 10 days after hatching fledglings start leaving nest, but exact fledging period unknown (Kushlan & Hancock, 2005).

Breeding success: Information not available/known.

Breeding cycle and interval: Information not available/known.

6.2.5. Yellow Bittern (Dhon raabondhi; *Botaurus sinensis*)

IUCN status: Least Concern



Global population estimate: 66,700–667,000 birds
Global population trend: UNKNOWN

Table 16: Distribution of Yellow Bittern (Dhon raabondhi; *Botaurus sinensis*) in the Maldives. Status: b = breeding; b? = breeding suspected; nb = non-breeding; - = absent/vagrant. If breeding is occurring, no information on non-breeding status is provided.

Area	Natural atoll	Administrative atoll	Status
North	Ihavandhippolhu	HA.	-
	Thiladunmathi	HA. + HDh.	-
	Makunudhoo	HDh.	-
	Miladhunmadulu	Sh. + N.	-
	North Maalhosmadulu	R.	-
	South Maalhosmadulu	B.	-
	Goifulhafehendhu	B.	-
	Faadhippolhu	Lh.	-
Central	Thoddu	AA.	-
	Ari	AA. + ADh.	-
	South Male	K.	-
	Felidhoo	V.	-
	North Nilandhoo	F.	-
	South Nilandhoo	Dh.	-
	Mulaku	M.	-
	Kolhumadulu	Th.	-
	Haddhunmathi	L.	-
South	Huvadhoo	GA. + GDh.	-
	Fuvahmulah	Gn.	b
	Addu	S.	-

6.2.5.1. Situation in the Maldives

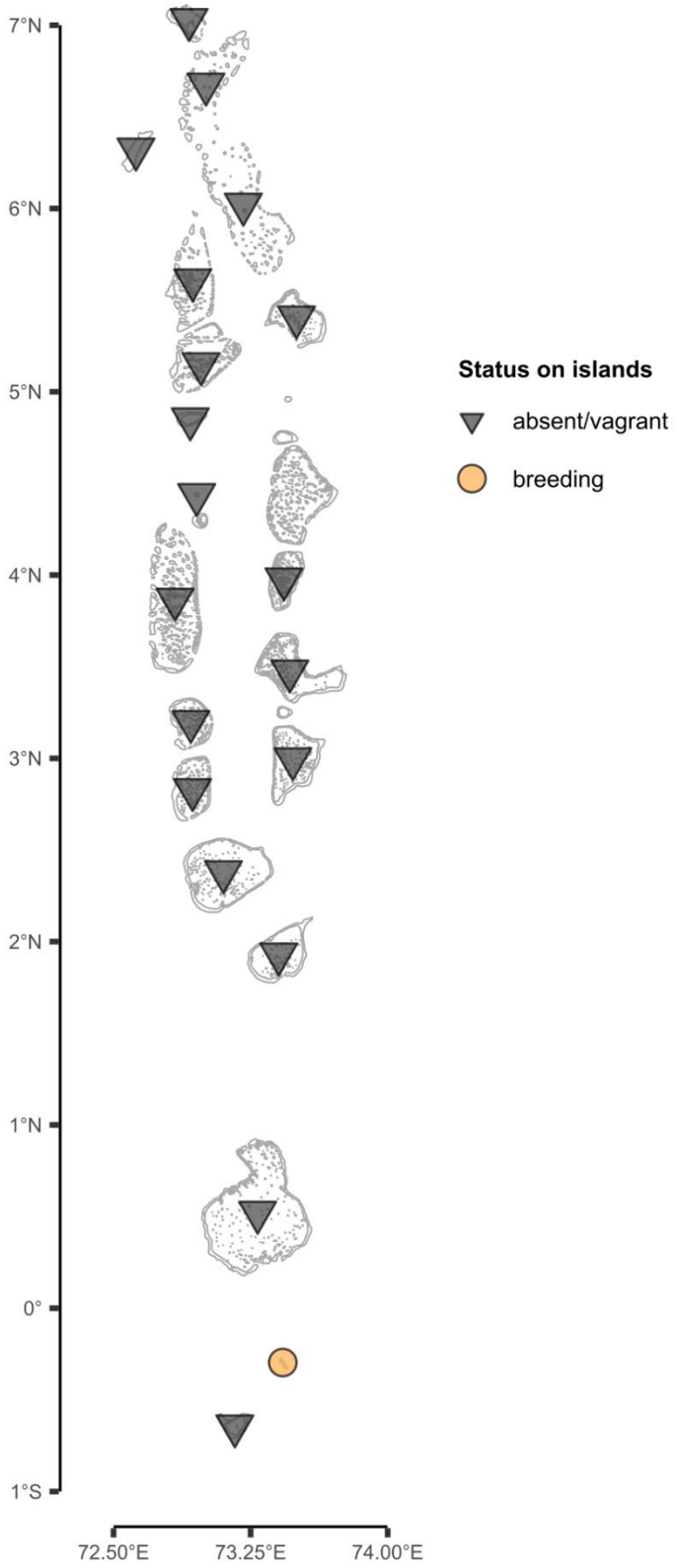
The Yellow Bittern is vagrant to the Maldives (Figure 30) and only rarely observed, but its occurrence was repeatedly linked to the beginning of the northeast monsoon season (Iruvai), and during the stormy seas and strong winds that mark the change between nakaiy (‘halha jahaa iru’). A small breeding population of Yellow Bittern exists in the wetlands on Fuvahmulah atoll. Anderson & Baldock (2001) speculated about a small resident population on Addu atoll, but this has not been confirmed yet.

Phillips (1964) reported the status of Yellow Bittern in the Maldives as unknown. Ash and Shafeeg (1994) considered Yellow Bittern a rare visitor.

6.2.5.2. Atoll-level summary

Northern Maldives
Ihavandhippolhu: not observed.
Thiladunmathi: infrequently observed in HA. Kelaa.
Makunudhoo: infrequently observed.
Miladhunmadulu: infrequently observed. Formerly more frequently.
North Maalhosmadulu: once observed 20 years ago.
South Maalhosmadulu: not observed.
Goifulhafehendhu: interviewee noted the bird to be abundant (40–50 birds) and possible breeding, which does not align with the general rare status of Yellow Bittern in the Maldives, so this account would need to be verified independently whether there exists an unknown resident population on Goifulhafehendhu atoll, or whether the interviewee misidentified birds.
Faadhippolhu: infrequently observed.

Central Maldives
Thoddu: not observed.
Ari: infrequently observed.
South Male: infrequently observed.
Felidhoo: not observed.
North Nilandhoo: one interviewee estimated 10–12 birds on F. Bilehdhoo and breeding populations on uninhabited islands, which does not align with the general rare status of Yellow Bittern in the Maldives, so this account would need to be verified independently whether there exists an unknown resident population on North Nilandhoo atoll, or whether the interviewee misidentified birds.
South Nilandhoo: infrequently observed. One interviewee noted breeding, see comment above.
Mulaku: infrequently observed.
Kolhumadulu: infrequently observed.
Haddhunmathi: observed during northeast monsoon on L. Kunahandhoo, L. Gaadhoo, and L. Hithadhoo.



Southern Maldives
Huvadhoo: infrequently observed in southern parts (GDh.) of the atoll.
Fuvahmulah: breeding in Fuvahmulah Nature Park wetland areas.
Addu: not observed.

Figure 30: Distribution of Yellow Bittern (Dhon raabondhi; *Botaurus sinensis*) in the Maldives. When breeding is occurring on an atoll, no information on roosting is provided. If only roosting is indicated, it means that no breeding is known to occur in the atoll.

6.2.5.3. Indian Ocean distribution

Breeding distribution:

Egypt, Oman, Indian subcontinent, Central to Eastern China, Taiwan, Southeast Asia, Indomalayan region, Philippines, Christmas Island, Seychelles, a small breeding population in the southern atolls of the Maldives (Martínez-Vilalta *et al*., 2024b) (Figure 31).

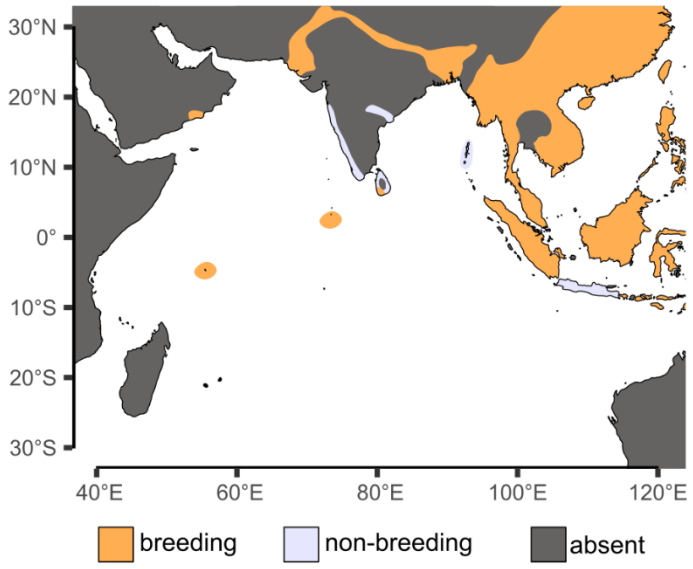


Figure 31: Indian Ocean-wide distribution map of Yellow Bittern (Dhon raabondhi; *Botaurus sinensis*).

Non-breeding distribution: Northern populations (Central China, North-western India) migrate to south of range, to southern India, Sri Lanka, Philippines, Indonesia (Martínez-Vilalta *et al*., 2024b). Usually departing in October, returning April to May (Wells, 1999). Nocturnal migration (Martínez-Vilalta *et al*., 2024b). Shorter movement patterns in breeding range associated with water availability (Martínez-Vilalta *et al*., 2024b).

6.2.5.4. Breeding biology

Average clutch	Incubation	Fledge	Nest	Diet
4–6 eggs	17–20 d	15–20 d	Freshwater marshes, reedbeds, dense aquatic vegetation	Aquatic insects, small fish

Timing: Egypt: breeding May to August (Hering *et al*., 2013). India: breeding June to September (Martínez-Vilalta *et al*., 2024b). Oman: breeding May to November (Martínez-Vilalta *et al*., 2024b). Thai-Malay peninsula: breeding July to October (Wells, 1999). Philippines: breeding February to May (Kennedy, 2000). Seychelles: breeding September and January (Safford & Hawkins, 2013).

Nest site: Usually solitary but can form small groups at favourable sites (Uchida & Matsuda, 1990). Breeding habitat freshwater marshes, reedbeds, and other dense aquatic vegetation around lakes, or inland swamps (Martínez-Vilalta *et al*., 2024b). Also in mangrove forests (Martínez-Vilalta *et al*., 2024b). Nest built 0–3 m above ground, usually above water or mud (Wells, 1999). Nesting in bushes, plants with reeds, grass, or in mangroves, occasionally in taller trees (e.g. *Ficus* spp.), generally

close to open water (Kushlan & Hancock, 2005). Nest is a flat platform of grass and leaves, 14.5–25 cm diameter (Uchida & Matsuda, 1990).

Clutch size: 4–6 eggs per clutch (Kushlan & Hancock, 2005).

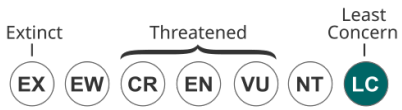
Incubation period: 17–20 days (Uchida & Matsuda, 1990).

Fledging: 15–20 days after hatching (Kushlan & Hancock, 2005).

Breeding success: Information not available/known.

Breeding cycle and interval: Information not available/known.

6.2.6. Black-crowned Night-heron (Raabondhi; *Nycticorax nycticorax*)



IUCN status: Least Concern
Global population estimate: 570,000–3,730,000 birds
Global population trend: DECREASING

6.2.6.1. Situation in the Maldives

The Black-crowned Night-heron is considered uncommon to the Maldives, with a potential breeding population in the southern atolls. However, none of the participating interviewees was able to provide any reliable information on this elusive heron species (see Methods section).

Phillips (1964) did not mention Black-crowned Night-heron. Ash and Shafeeg (1994) reported only a single record to be available from the Maldives.

6.2.6.2. Indian Ocean distribution

Breeding distribution:

From Europe to Japan, Africa, Madagascar, India, Sri Lanka, Southeast Asia, China, Taiwan, Indomalayan region, Philippines (Hothem *et al*., 2020) (Figure 32).

Non-breeding distribution:
Some northern range populations overwinter in the southern part of its distribution range. Tropical populations undergo seasonal dispersive movements (Hothem *et al*., 2020).

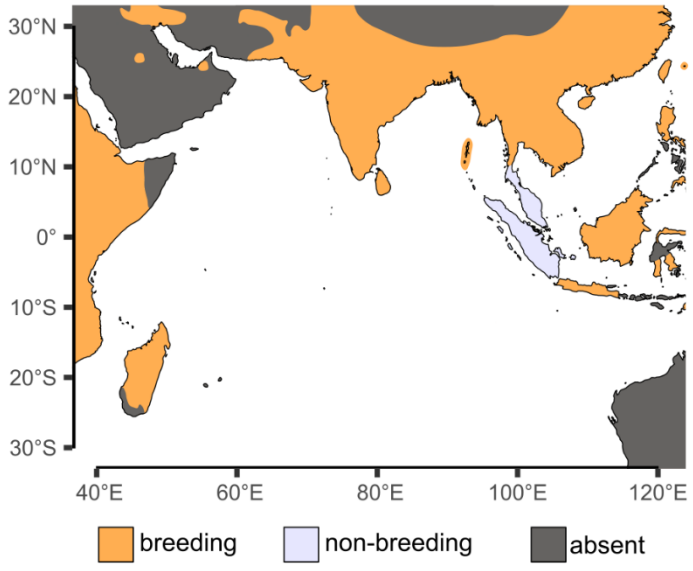


Figure 32: Indian Ocean-wide distribution map of Black-crowned Night-heron (Raabondhi; *Nycticorax nycticorax*).

6.2.6.3. Breeding biology

Average clutch	Incubation	Fledge	Nest	Diet
1–8 eggs	23–26 d	29–34 d	Swamps, fresh- and saltwater bodies, wet agricultural fields	Terrestrial and aquatic insects, fish

Timing: Breeding in the tropical to subtropical region usually timed with rainy seasons (Hothem *et al*., 2020). Ethiopia: breeding August to September (Ash & Atkins, 2009). Eastern Africa: breeding December to January and April to June (Dowsett *et al*., 2008). Madagascar: breeding August to January (Safford & Hawkins, 2013). Northern India: breeding April to September (Kushlan & Hancock, 2005). Southern India: breeding December to February (Kushlan & Hancock, 2005). Eastern Java: breeding December to April (Kushlan & Hancock, 2005). Western Java: breeding February to July (Kushlan & Hancock, 2005).

Nest site: Highly variable, depending on location (Hothem *et al*., 2020). Known breeding habitats include swamps, streams, rivers, ponds, lakes, lagoons, tidal mudflats, salt marshes, wet agricultural fields (Hothem *et al*., 2020). Most colony sites are on islands, in swamps, and/or over water, suggesting that predator avoidance is a key factor in site selection (Hothem *et al*., 2020). Nests in trees, shrubs, reed grass, grass tussocks, palms (Hothem *et al*., 2020). Generally, prefers live over dead trees/shrubs (Bjorklund & Holm, 1997; Cuthbert *et al*., 2002). Nest built 1–14 m above ground (Hothem *et al*., 2020).

Clutch size: 1–8 eggs per clutch, with average of 3–5 eggs (Hothem *et al*., 2020).

Incubation period: 23–26 days in North American populations (Hothem *et al*., 2020); probably shorter in the tropics (Hancock & Kushlan, 1984). Re-laying common if nest fails early (Cramp & Simmons, 1977).

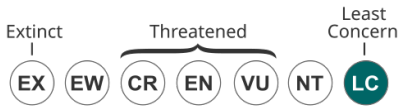
Fledging: Young leave nests at 29–34 days of age but cannot fly at that point (Thompson & Littlefield, 1980). First flight took place at 40–50 days (Snow *et al*., 1998).

Breeding success: 82–87% hatching success in North American colonies (Parsons *et al*., 2001); 75% hatching success in a colony in China (Hothem *et al*., 2020). Fledging success 57–90% in North American colonies (Hothem & Hatch, 2004), 74–100% fledging success in a colony in Oregon, US (Blus *et al*., 1997).

Breeding cycle and interval: One brood per season (Hothem *et al*., 2020). Sexual maturity at 2–3 years of age (Grussu, 2008; Kushlan & Hancock, 2005).

6.2.7. Little Egret (Kuda lagana; *Egretta garzetta*)

IUCN status: Least Concern



Global population estimate: 660,000 – 3,150,000 birds
Global population trend: INCREASING

Table 17: Distribution of Little Egret (Kuda lagana; *Egretta garzetta*) in the Maldives. Status: b = breeding; b? = breeding suspected; nb = non-breeding; - = absent/vagrant, ? = uncertain. If breeding is occurring, no information on non-breeding status is provided.

Area	Natural atoll	Administrative atoll	Status
North	Ihavandhippolhu	HA.	?
	Thiladunmathi	HA. + HDh.	nb
	Makunudhoo	HDh.	nb
	Miladhunmadulu	Sh. + N.	nb
	North Maalhosmadulu	R.	nb
	South Maalhosmadulu	B.	nb
	Goifulhafehendhu	B.	nb
	Faadhippolhu	Lh.	nb
Central	Thoddu	AA.	nb
	Ari	AA. + ADh.	nb
	South Male	K.	nb
	Felidhoo	V.	nb
	North Nilandhoo	F.	nb
	South Nilandhoo	Dh.	-
	Mulaku	M.	nb
	Kolhumadulu	Th.	nb
	Haddhunmathi	L.	nb
South	Huvadhoo	GA. + GDh.	-
	Fuvahmulah	Gn.	nb
	Addu	S.	nb

6.2.7.1. Situation in the Maldives

The Little Egret (*Egretta garzetta*) is an uncommon migratory species to the Maldives (Figure 33), and its occurrence is generally linked to the northeast monsoon season (Iruvai). The Little Egret was reported to be seen more commonly and abundantly in the northern and central atolls than in the southern atolls. In Haddhunmathi atoll, the Little Egret is a popular target for bird-catching activities, which one interviewee gave as an explanation for its general decline and entire disappearance from some islands.

Phillips (1964) considered the Little Egret an occasional winter visitor. Ash and Shafeeg (1994) reported the Little Egret as an uncommon winter visitor.

6.2.7.2. Atoll-level summary

Northern Maldives
Ihavandhippolhu: uncertain status.
Thiladunmathi: non-breeding visitor.
Makunudhoo: non-breeding visitor.
Miladhunmadulu: non-breeding visitor.
North Maalhosmadulu: non-breeding visitor.
South Maalhosmadulu: non-breeding visitor.
Goifulhafehendhu: non-breeding visitor.
Faadhippolhu: non-breeding visitor.

Central Maldives
Thoddu: non-breeding visitor.
Ari: non-breeding visitor.
South Male: non-breeding visitor.
Felidhoo: non-breeding visitor.
North Nilandhoo: non-breeding visitor.
South Nilandhoo: infrequently observed.
Mulaku: non-breeding visitor.
Kolhumadulu: non-breeding visitor.
Haddhunmathi: non-breeding visitor on uninhabited islands, formerly more abundant.

Southern Maldives
Huvadhoo: infrequently observed.
Fuvahmulah: non-breeding visitor.
Addu: non-breeding visitor in Addu Nature Park.

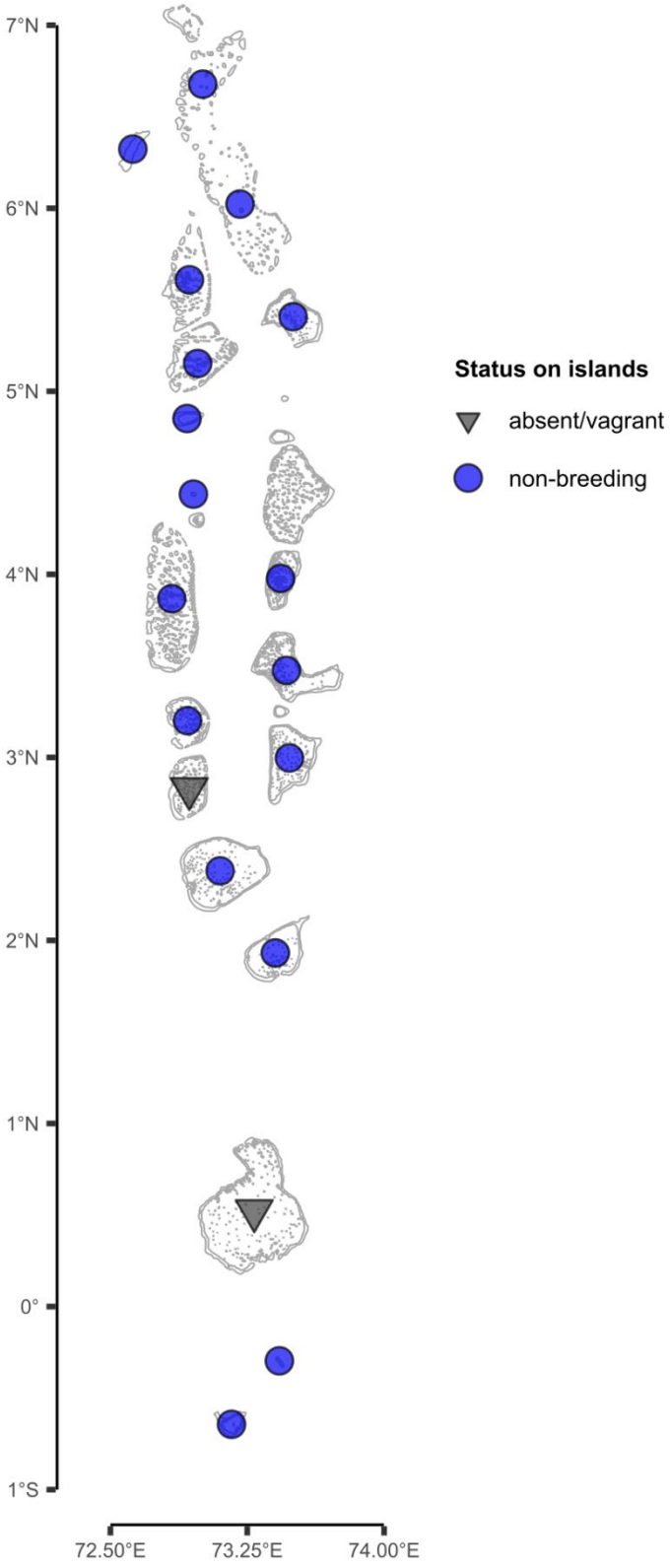


Figure 33: Distribution of Little Egret (Kuda lagana; *Egretta garzetta*) in the Maldives. When breeding is occurring on an atoll, no information on roosting is provided. If only roosting is indicated, it means that no breeding is known to occur in the atoll.

6.2.7.3. Indian Ocean distribution

Breeding distribution:

Pakistan, India, Southeast Asia, Southern China, Philippines, Indonesia, Indomalayan region, Northern to South-eastern Australia, Egypt, Tanzania and southward to South Africa, Seychelles (Mlodinow *et al*., 2024) (Figure 34).

Non-breeding distribution: Known to do large post-breeding movements, with juveniles moving several hundred kilometres before settling at a new colony. Partially migratory, most migration occurs in the northern populations, moving into the Thai-Malay peninsula and Indomalayan region (Mlodinow *et al*., 2024).

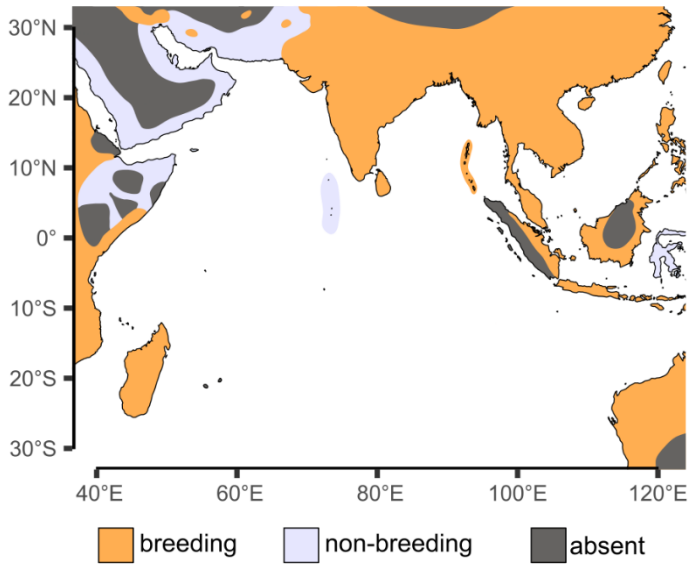


Figure 34: Indian Ocean-wide distribution map of Little Egret (Kuda lagana; *Egretta garzetta*).

6.2.7.4. Breeding biology

Average clutch	Incubation	Fledge	Nest	Diet
1–7 eggs	21–25 d	40–45 d	Trees, shrubs, mangroves, wetlands, near water	Small fish, insects, amphibians, reptiles

Timing: Breeding generally synchronized with rainy season in the tropics. Northern India: breeding July to September (Mlodinow *et al*., 2024). Southern India: breeding November to February (Mlodinow *et al*., 2024). Vietnam: breeding June to August (Mlodinow *et al*., 2024). Southern Thailand: breeding December to April (Buatip *et al*., 2013). Borneo: breeding April to June (Mann, 2008). Northern Australia: breeding January to April (Mlodinow *et al*., 2024). Seychelles: breeding November to January (Safford & Hawkins, 2013). Madagascar: breeding predominantly July (Safford & Hawkins, 2013).

Nest site: Usually forms dense breeding colonies, often with other heron species (Mlodinow *et al*., 2024). Breeding habitat shallow wetlands, from freshwater, brackish water, to saltwater habitats, around lakes, swamps, and marshes (Kushlan & Hancock, 2005). Also, along sandy beaches, mudflats, and mangroves (Kushlan & Hancock, 2005). Nests built 0–20 m above ground in shrubs, reeds, or trees

(Hilaluddin *et al*., 2006; Kushlan & Hancock, 2005). Ground-nesting only in well-protected sites (Kushlan & Hancock, 2005).

Clutch size: 1–7 eggs per clutch (Prosper & Hafner, 1996).

Incubation period: 21–25 days (Kushlan & Hancock, 2005).

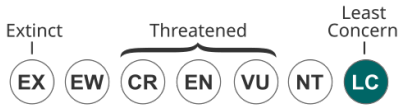
Fledging: 40–45 days after hatching, sometimes observed leaving the nest as early as 30 days after hatching (Kushlan & Hancock, 2005).

Breeding success: 90.2% hatching success in Israel (Ashkenazi & Yom-tov, 1997), 74% hatching success in southern India (Seedikkoya & Azeez, 2012).

Breeding cycle and interval: Typically breeds when one year old (Hafner *et al*., 1998). One brood per year (Safford & Hawkins, 2013).

6.2.8. Striated Heron (Dhivehi raabondhi; *Butorides striata*)

IUCN status: Least Concern



Global population estimate: 173,000–1,500,000 birds
Global population trend: STABLE

Table 18: Distribution of Striated Heron (Dhivehi raabondhi; *Butorides striata*) in the Maldives. Status: b = breeding; b? = breeding suspected; nb = non-breeding; - = absent/vagrant. If breeding is occurring, no information on non-breeding status is provided.

Area	Natural atoll	Administrative atoll	Status
North	Ihavandhippolhu	HA.	b
	Thiladunmathi	HA. + HDh.	b
	Makunudhoo	HDh.	b
	Miladhunmadulu	Sh. + N.	b
	North Maalhosmadulu	R.	b
	South Maalhosmadulu	B.	nb
	Goifulhafehendhu	B.	nb
	Faadhippolhu	Lh.	b
Central	Thoddu	AA.	nb
	Ari	AA. + ADh.	b
	South Male	K.	b?
	Felidhoo	V.	b
	North Nilandhoo	F.	b
	South Nilandhoo	Dh.	b
	Mulaku	M.	b
	Kolhumadulu	Th.	b
	Haddhunmathi	L.	b
South	Huvadhoo	GA. + GDh.	b
	Fuvahmulah	Gn.	b
	Addu	S.	b

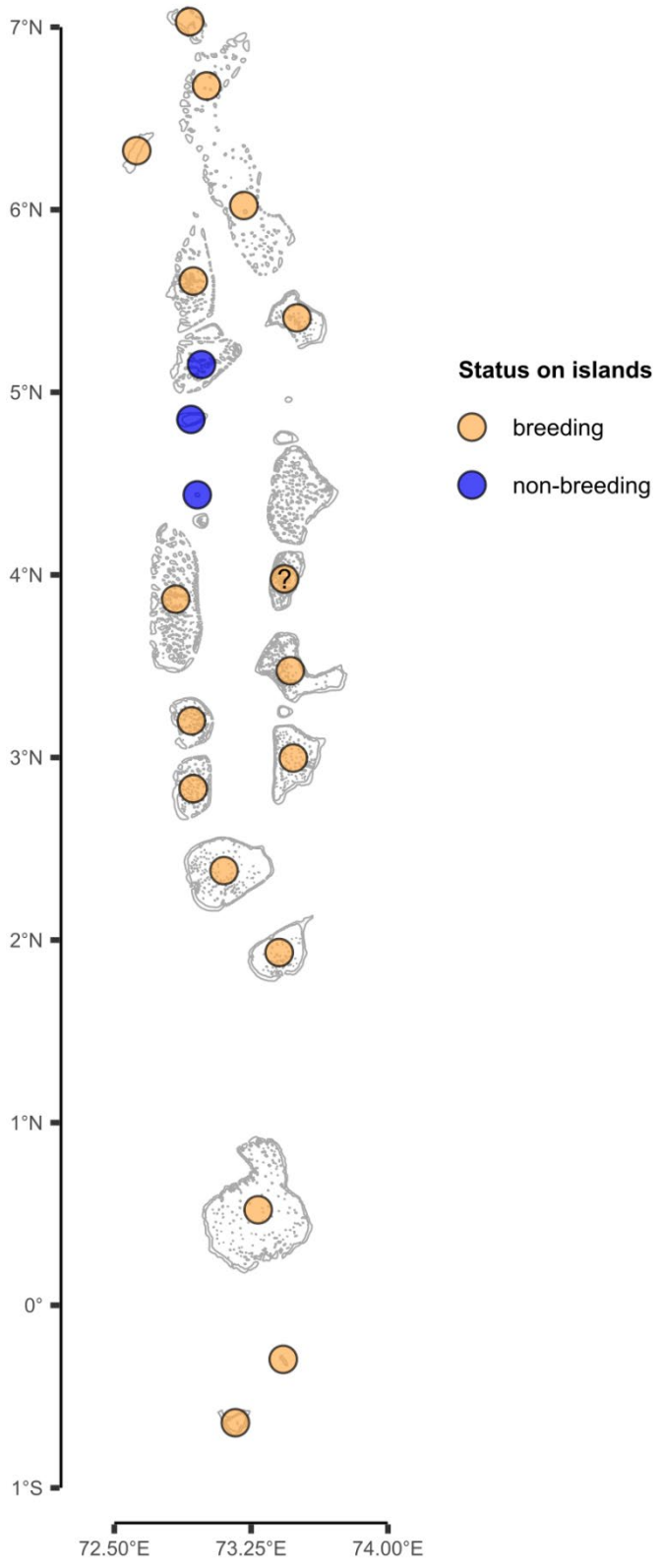
6.2.8.1. Situation in the Maldives

The Striated Heron (*Butorides striata*) is a widely distributed breeding species in the Maldives (Figure 35). It occurs in two distinct endemic subspecies in the Maldives; *Butorides striata albidula* in the Southern Maldives and *B. s. didii* in the Northern Maldives (Anderson & Shimal, 2020). The Striated Heron is widely known to nest in mangrove areas, and on small sandbanks (‘finolhuthah’) and other uninhabited islands with extensive ironwood (Kuredhi; *Pemphis acidula*) shrubland, in which it builds its nests. Striated Heron nests are commonly poached for their eggs. Interviewees in the Central and Southern Maldives noted that Striated Heron populations are decreasing and already disappeared from some atolls in the Central Maldives entirely as a breeding species due to habitat loss from resort development, construction, dredging, sand mining, and too frequent disturbance of breeding islands by visitors (e.g. resort picnics).

Phillips (1964) considered both subspecies to be plentiful and widely breeding in their respective ranges of the northern/southern atolls. Ash and Shafeeg (1994) reported the Striated Heron as a common resident throughout the archipelago that is probably in decline.

6.2.8.2. Atoll-level summary

Northern Maldives
Ihavandhippolhu: breeding.
Thiladunmathi: breeding in mangrove forests, on uninhabited islands, and forested parts of inhabited islands such as HA. Filladhoo (Dhapparu area).
Makunudhoo: breeding.
Miladhunmadulu: breeding on Sh. Boduhuraa and on rocky banks (‘gaahuraa’) and sandbanks (‘finolhuthah’) where there is ironwood (Kuredhi; *Pemphis acidula*).
North Maalhosmadulu: breeding on uninhabited islands.
South Maalhosmadulu: resident but not known to breed.
Goifulhafehendhu: resident but not known to breed.
Faadhippolhu: breeding on Lh. Olhuvelifushi and uninhabited islands.



Central Maldives

Thoddu: uncommon resident but not known to breed.

Ari: breeding in forested areas including on inhabited islands ADh. Dhigurah and ADh. Mandhoo.

South Male: uncommon resident. Formerly also breeding but nowadays breeding status uncertain.

Felidhoo: breeding. Formerly more abundant.

North Nilandhoo: breeding on F. Nilandhoo and on uninhabited islands.

South Nilandhoo: breeding on uninhabited islands. Formerly more abundant.

Mulaku: breeding on an uninhabited island near M. Muli, and on M. Seedheehuraa.

Kolhumadulu: breeding. Formerly more abundant.

Haddhunmathi: breeding on uninhabited islands near L. Maavah, and L. Kalhurahaa. Formerly more abundant.

Southern Maldives

Huvadhoo: breeding on GDh. Kafena, GDh. Madaveli and other uninhabited islands in northern (GA.) and southern (GDh.) parts of the atoll.

Fuvahmulah: breeding in Fuvahmulah Nature Park wetland areas.

Addu: breeding in Addu Nature Park in Koattey and Eedhigalhi Kilhi. Roosting in S. Mulikede and S. Kan'dihera gan'du.

Figure 35: Distribution of Striated Heron (Dhivehi raabondhi; *Butorides striata*) in the Maldives. When breeding is occurring on an atoll, no information on roosting is provided. If only roosting is indicated, it means that no breeding is known to occur in the atoll.

6.2.8.3. Indian Ocean distribution

Breeding distribution:

Throughout Africa, along Red Sea, Madagascar, Seychelles, Comoros, Mascarene Islands, Lakshadweep, Indian Subcontinent, Southeast Asia, China, Indomalayan region, North-western Australia (Martínez-Vilalta *et al*., 2020a) (Figure 36).

Non-breeding distribution:

Mostly sedentary in the tropics to subtropics. Northern populations migrate from China to Sumatra, Philippines, Nicobar Islands, Borneo. Some populations known for post-breeding dispersal (Martínez-Vilalta *et al*., 2020a).

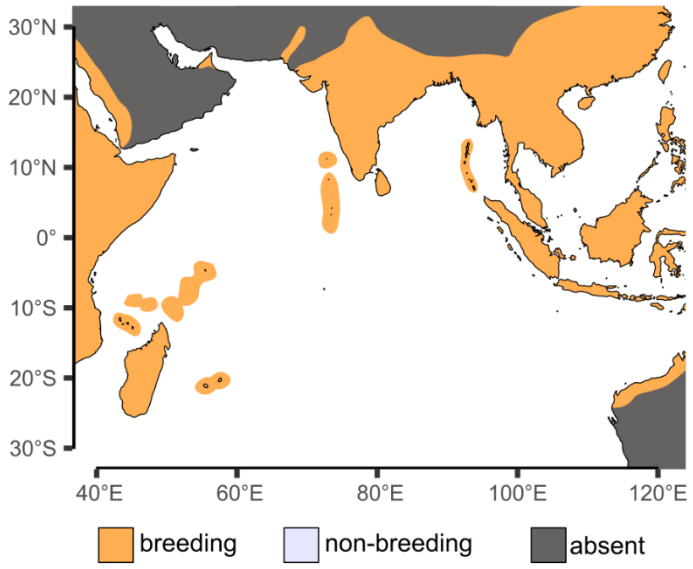


Figure 36: Indian Ocean-wide distribution map of Striated Heron (Dhivehi raabondhi; *Butorides striata*).

6.2.8.4. Breeding biology

Average clutch	Incubation	Fledge	Nest	Diet
3–5 eggs	19–29 d	14–30 d	Mangroves, vegetation near ponds or shore	Fish, invertebrates, amphibians

Timing: Breeding variable between locations, generally related to rainfall (Martínez-Vilalta *et al*., 2020a). Thai-Malay peninsula: breeding January to September (Wells, 1999). Java: breeding March to June (Monnet & Varney, 1998). Northern Australia: breeding November to April (Monnet & Varney, 1998). Western Australia: breeding September to January (Monnet & Varney, 1998). Seychelles: breeding October to March (Safford & Hawkins, 2013). Arabia: breeding April to August (Jennings, 2010).

Nest site: Generally nesting alone, but sometimes in groups of up to 100 breeding pairs (Kushlan & Hancock, 2005). Typically, in mangroves, or dense vegetation close to ponds or shore (Martínez-Vilalta *et al*., 2020a). Also observed nesting in grassy marshlands and coconut plantations (Safford & Hawkins, 2013). Nest built from sticks and twigs, 20 x 40 cm nest dimensions (Kushlan & Hancock, 2005). Nests usually well hidden among branches of trees or shrubs (Martínez-Vilalta *et al*.,

2020a). Preferred nest height 0.1–10 m above ground, usually above water (Martínez-Vilalta *et al*., 2020a).

Clutch size: 3–5 eggs per clutch (Monnet & Varney, 1998). In some areas two separate clutches laid at intervals of 16–38 days (Monnet & Varney, 1998).

Incubation period: 19–29 days but varying geographically (Kushlan & Hancock, 2005).

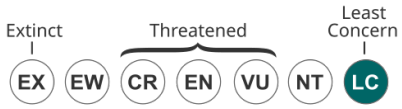
Fledging: 14–30 days after hatching (Olguín *et al*., 2015).

Breeding success: Crows are known nest predators (Kushlan & Hancock, 2005) but otherwise no information on exact breeding success available/known.

Breeding cycle and interval: First breeding usually in second year (Kushlan & Hancock, 2005).

6.2.9. Indian Pond-heron (Huvadhoo raabondhi; *Ardeola grayii*)

IUCN status: Least Concern



Global population estimate: 66,700–667,000 birds
Global population trend: UNKNOWN

6.2.9.1. Situation in the Maldives

The Indian Pond-heron is a widespread visitor to the Maldives. However, interviewees did not provide reliable information on this bird species (see Methods section). The Indian Pond-heron is a tentatively endemic subspecies in the Maldives, *Ardeola grayii phillipsi,* with a small breeding population in Addu and Huvadhoo atolls.

Phillips (1964) considered the Indian Pond-heron as a resident confined to Addu and Huvadhoo atolls. Ash and Shafeeg (1994) reported the endemic subspecies of the Indian Pond-heron as an abundant resident to the southern atolls, while the nominate subspecies was considered a straggler to the northern and central atolls.

6.2.9.2. Indian Ocean distribution

Breeding distribution:

Persian Gulf, Indian Subcontinent, Sri Lanka, Myanmar, Lakshadweep, Andaman and Nicobar Islands (Martínez-Vilalta *et al*., 2020c) (Figure 37).

Non-breeding distribution:
Generally, a sedentary species, but local movements following water availability (monsoons) (Martínez-Vilalta *et al*., 2020c). Regular movements into Lakshadweep, Maldives, Andaman and Nicobar Islands for overwintering (Rasmussen & Anderton, 2005).

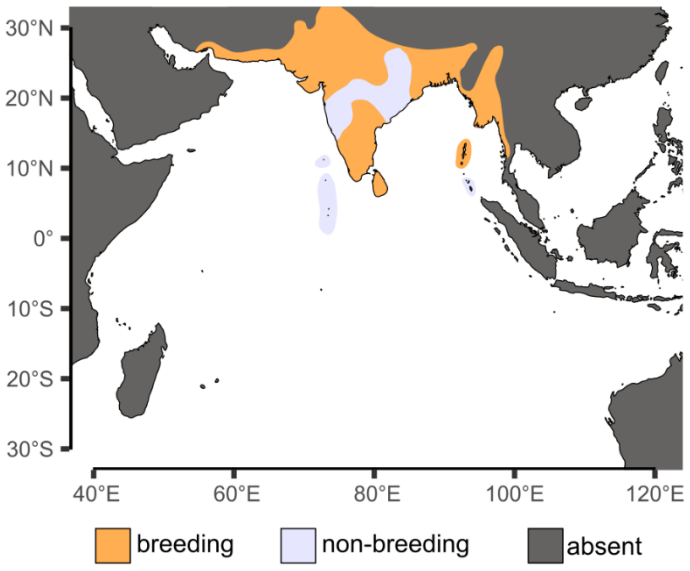


Figure 37: Indian Ocean-wide distribution map of Indian Pond-heron (Huvadhoo raabondhi; *Ardeola grayii*).

6.2.9.3. Breeding biology

Average clutch	Incubation	Fledge	Nest	Diet
4 eggs	19–24 d	25–35 d	Trees and shrubs, near water sources	Small fish, amphibians, crustaceans, aquatic insects

Timing: Northern India: breeding May to September (Kushlan & Hancock, 2005). Southern India: breeding December to May (Narayanan & Vijayan, 2007). Sri Lanka: breeding December to May (Narayanan & Vijayan, 2007). Pakistan: breeding April to September (Roberts, 1991).

Nest site: Nests colonially, but usually in small monospecific groups, sometimes mixed with other herons (Martínez-Vilalta *et al*., 2020c). Nest built in forks of trees or shrubs, usually 2–16 m above ground (Kushlan & Hancock, 2005; Roberts, 1991). Breeding habitat includes rivers, streams, marshes, tidal mudflats, mangroves, but also in towns and cities, with a general preference for shallow, still or slow-flowing waters (Kushlan & Hancock, 2005; Roberts, 1991).

Clutch size: On average 4 eggs per clutch (Kushlan & Hancock, 2005).

Incubation period: 19–24 days (Fazili, 2014; Jaman *et al*., 2012; Kushlan & Hancock, 2005).

Fledging: 25–35 days (Fazili, 2014; Jaman *et al*., 2012).

Breeding success: Hatching success 73% and fledging success 64% in a northern Indian population (Wani *et al*. 2017).

Breeding cycle and interval: Information not available/known.

6.2.10. Eastern Cattle-egret (Iruvaihudhu; *Ardea coromanda*)

IUCN status: Least Concern

Global population estimate: 4,000,000 – 9,850,000 birds*
Global population trend: INCREASING*

*including Western Cattle-egret (*Ardea ibis*)

Table 19: Distribution of Eastern Cattle-egret (Iruvaihudhu; *Ardea coromanda*) in the Maldives. Status: b = breeding; b? = breeding suspected; nb = non-breeding; - = absent/vagrant. If breeding is occurring, no information on non-breeding status is provided.

Area	Natural atoll	Administrative atoll	Status
North	Ihavandhippolhu	HA.	nb
	Thiladunmathi	HA. + HDh.	nb
	Makunudhoo	HDh.	nb
	Miladhunmadulu	Sh. + N.	nb
	North Maalhosmadulu	R.	nb
	South Maalhosmadulu	B.	nb
	Goifulhafehendhu	B.	nb
	Faadhippolhu	Lh.	nb
Central	Thoddu	AA.	nb
	Ari	AA. + ADh.	nb
	South Male	K.	nb
	Felidhoo	V.	nb
	North Nilandhoo	F.	nb
	South Nilandhoo	Dh.	nb
	Mulaku	M.	nb
	Kolhumadulu	Th.	nb
	Haddhunmathi	L.	nb
South	Huvadhoo	GA. + GDh.	nb
	Fuvahmulah	Gn.	nb
	Addu	S.	nb

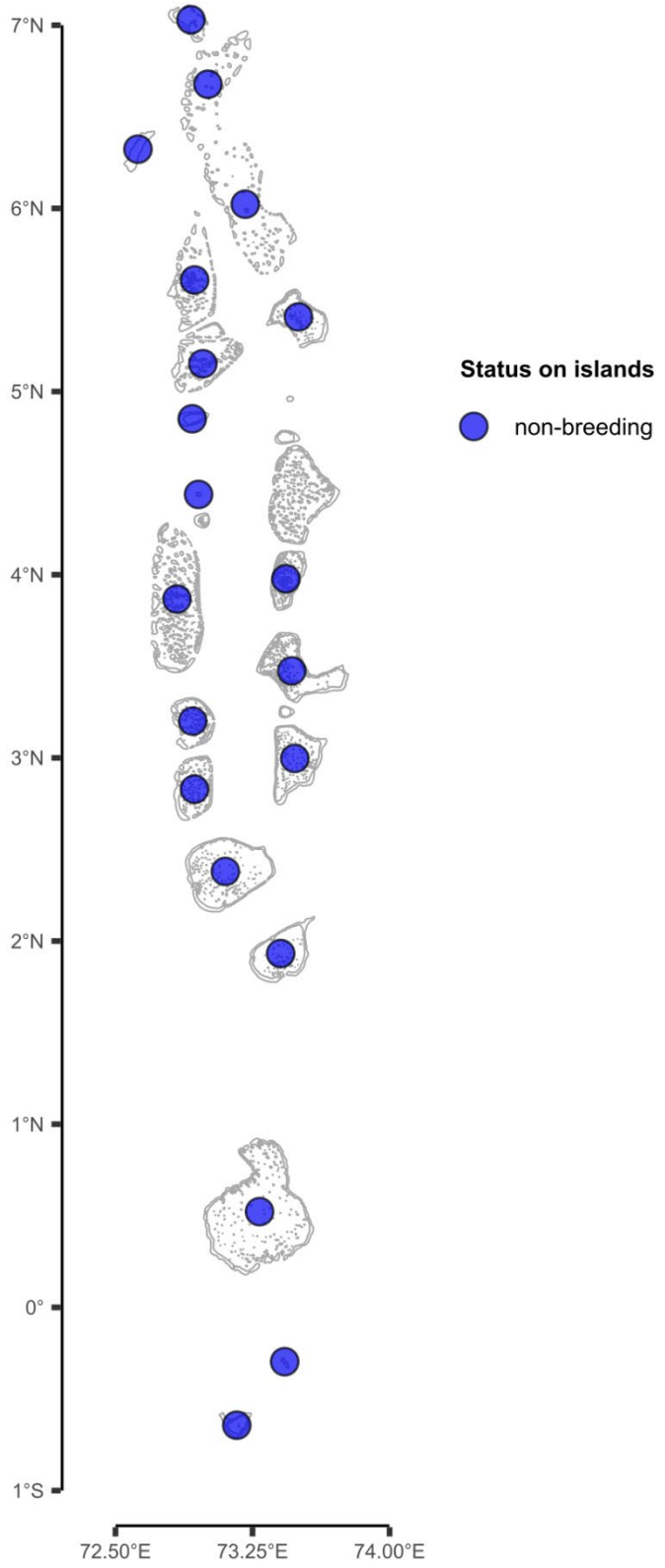
6.2.10.1.Situation in the Maldives

The Eastern Cattle-egret is a well-known and widespread migratory species that is overwintering in the Maldives (Figure 38). Its arrival and presence is closely related to the northeast monsoon season (Iruvai), which is also reflected in its Dhivehi name (Iruvai hudhu), with ‘hudhu’ meaning ‘white’ and referring to the Cattle-egret’s all-white non-breeding plumage. Low numbers of Eastern Cattle-egret also remain well into the southwest monsoon season (Hulhangu), but the species is generally known to disappear soon after it turns orange, i.e. moulting into its breeding plumage. Some fishers have observed Eastern Cattle-egret at sea outside the atolls when they migrate from the Indian subcontinent into the Maldivian waters. The Eastern Cattle-egret is abundant and widespread throughout the Maldivian atolls, with as many as hundred birds estimated to stay across the islands of an atoll. Interviewees of the south-central atolls (North Nilandhoo, South Nilandhoo, Kolhumadulu) all noted that birds have significantly declined in recent years. The Eastern Cattle-egret is a popular target among bird poachers for the pet trade.

Phillips (1964) reported the Eastern Cattle-egret as a frequent visitor to the Maldives and mentioned a breeding record from Addu atoll. Ash and Shafeeg (1994) reported the Eastern Cattle-egret as a regular visitor that arrived in small flocks from October to November and stayed in the Maldives until March to May.

6.2.10.2.Atoll-level summary

Northern Maldives
Ihavandhippolhu: non-breeding visitor.
Thiladunmathi: non-breeding visitor.
Makunudhoo: non-breeding visitor.
Miladhunmadulu: non-breeding visitor.
North Maalhosmadulu: non-breeding visitor.
South Maalhosmadulu: non-breeding visitor.
Goifulhafehendhu: non-breeding visitor.
Faadhippolhu: non-breeding visitor.



Central Maldives
Thoddu: non-breeding visitor.
Ari: non-breeding visitor.
South Male: non-breeding visitor.
Felidhoo: non-breeding visitor.
North Nilandhoo: non-breeding visitor. Formerly more abundant.
South Nilandhoo: non-breeding visitor. Formerly more abundant.
Mulaku: non-breeding visitor.
Kolhumadulu: non-breeding visitor. Formerly more abundant.
Haddhunmathi: non-breeding visitor.

Southern Maldives
Huvadhoo: non-breeding visitor.
Fuvahmulah: non-breeding visitor.
Addu: non-breeding visitor.

Figure 38: Distribution of Eastern Cattle-egret (Iruvaihudhu; *Ardea coromanda*) in the Maldives. When breeding is occurring on an atoll, no information on roosting is provided. If only roosting is indicated, it means that no breeding is known to occur in the atoll.

6.2.10.3.Indian Ocean distribution

Breeding distribution:

South of Himalayas in Pakistan, India, Sri Lanka, Nepal, Bangladesh, Southeast China, Taiwan, Southeast Asia, Nicobar and Andaman Islands, Indomalayan region (Telfair II *et al*., 2024) (Figure 39).

Non-breeding distribution: Strongly migratory species, with migration being largely triggered with changes in monsoon in Indian populations. Overwintering population in the Maldives (Telfair II *et al*., 2024).

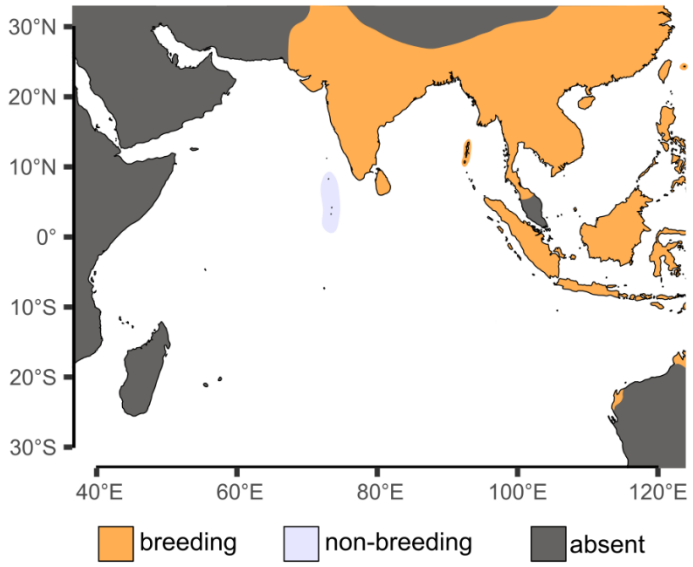


Figure 39: Indian Ocean-wide distribution map of Eastern Cattle-egret (Iruvaihudhu; *Ardea coromanda*).

6.2.10.4.Breeding biology

Average clutch	Incubation	Fledge	Nest	Diet
3–5 eggs	?	25 d	In trees, shrubs, wetlands, mangroves, near water sources	Insects, spiders, amphibians, fish

Timing: Varies with resource availability, likely driven by monsoon seasons (Ali, 1979; Singh, 1985). North India: breeding June to August (Ali & Ripley, 1983). South India: breeding November to February (Ali & Ripley, 1983). Sri Lanka: breeding February to July (Ali & Ripley, 1983). Australia: breeding October to March (McKilligan, 1997).

Nest site: Nests among other heron species in colonies (Telfair II *et al*., 2024). Breeding habitat variable, including coastal fringing vegetation, marshes, lakes, wetlands, swamps, riparian forests (Telfair II *et al*., 2024). Nests built in trees, shrubs, wetlands, and mangroves, also in reed vegetation in marshes. Generally, prefers nesting high up in trees (Hilaluddin & Shawl, 2003).

Clutch size: 3–5 eggs per clutch (Ali & Ripley, 1983; Singh *et al*., 1988).

Incubation period: Information not available/known.

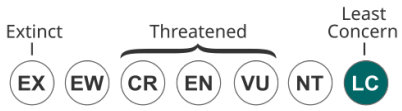
Fledging: At 25 days, chicks are capable of fleeing and maintaining balance (Singh *et al*., 1988).

Breeding success: 81% of nests with successful eggs, and on average 2.6 fledglings (McKilligan, 1985).

Breeding cycle and interval: One brood per year (Singh *et al*., 1988), with first breeding at one year old (Telfair II *et al*., 2024).

6.2.11. Great Egret (Lagana; *Ardea alba*)

IUCN status: Least Concern



Global population estimate: 590,000–2,200,000 birds
Global population trend: UNKNOWN

Table 20: Distribution of Great Egret (Lagana; *Ardea alba*) in the Maldives. Status: b = breeding; b? = breeding suspected; nb = non-breeding; - = absent/vagrant, ? = uncertain. If breeding is occurring, no information on non-breeding status is provided.

Area	Natural atoll	Administrative atoll	Status
North	Ihavandhippolhu	HA.	?
	Thiladunmathi	HA. + HDh.	-
	Makunudhoo	HDh.	-
	Miladhunmadulu	Sh. + N.	-
	North Maalhosmadulu	R.	-
	South Maalhosmadulu	B.	-
	Goifulhafehendhu	B.	-
	Faadhippolhu	Lh.	-
Central	Thoddu	AA.	-
	Ari	AA. + ADh.	-
	South Male	K.	-
	Felidhoo	V.	-
	North Nilandhoo	F.	-
	South Nilandhoo	Dh.	-
	Mulaku	M.	-
	Kolhumadulu	Th.	-
	Haddhunmathi	L.	-
South	Huvadhoo	GA. + GDh.	-
	Fuvahmulah	Gn.	-
	Addu	S.	-

6.2.11.1.Situation in the Maldives

The Great Egret (*Ardea alba*) is an uncommon and irregular visitor to the Maldives (Figure 40). On most atolls, interviewees had seen the species only infrequently, with one interviewee estimating a sighting once every three years on average. Usually, there are no more than 1–2 birds seen, and their occurrence is generally linked to the northeast monsoon season (Iruvai). The Great Egret is poached for the pet-trade. On Haddhunmathi atoll (Laamu), it was formerly seen more regularly but the bird disappeared with the degradation of a major wetland, where it was usually seen.

Phillips (1964) reported the Great Egret as a frequent winter visitor. Ash and Shafeeg (1994) considered it a frequent visitor to the Maldives.

6.2.11.2.Atoll-level summary

Northern Maldives
Ihavandhippolhu: status uncertain.
Thiladunmathi: infrequently observed.
Makunudhoo: infrequently observed. Formerly more abundant and regular.
Miladhunmadulu: infrequently observed.
North Maalhosmadulu: infrequently observed.
South Maalhosmadulu: infrequently observed.
Goifulhafehendhu: not observed.
Faadhippolhu: infrequently observed.

Central Maldives
Thoddu: infrequently observed.
Ari: infrequently observed.
South Male: infrequently observed.
Felidhoo: infrequently observed.
North Nilandhoo: once observed ca. 15 years ago.
South Nilandhoo: infrequently observed.
Mulaku: very rarely observed.
Kolhumadulu: very rarely observed.
Haddhunmathi: very rarely observed. Formerly more frequently.

Southern Maldives
Huvadhoo: infrequently observed. Formerly more frequently.
Fuvahmulah: single birds sometimes seen in the Fuvahmulah Nature Park wetland areas.
Addu: infrequently observed in Addu Nature Park wetlands.

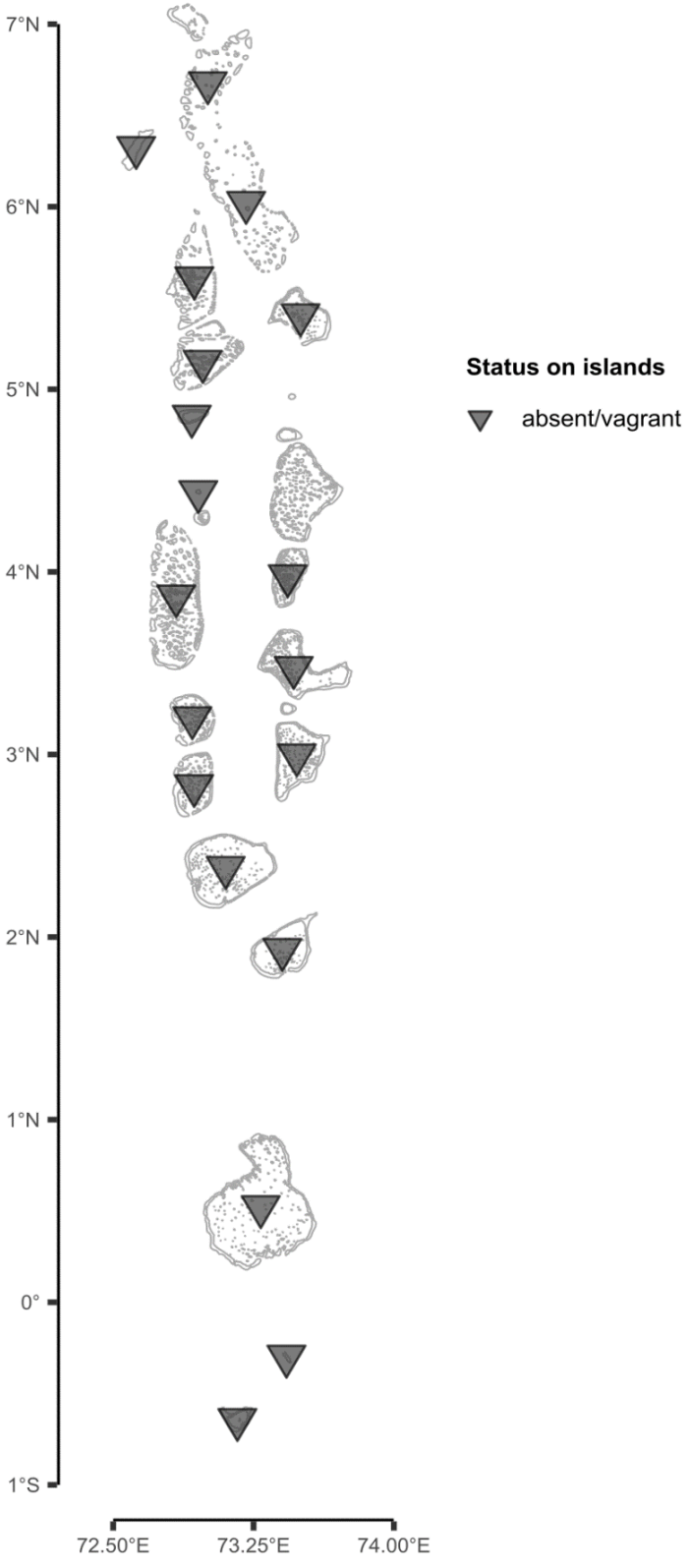


Figure 40: Distribution of Great Egret (Lagana; *Ardea alba*) in the Maldives. When breeding is occurring on an atoll, no information on roosting is provided. If only roosting is indicated, it means that no breeding is known to occur in the atoll.

6.2.11.3.Indian Ocean distribution

Breeding distribution:

India, East to Southeast Asia, China, Indomalayan region, Australia, Africa, Madagascar (McCrimmon Jr. *et al*., 2020) (Figure 41).

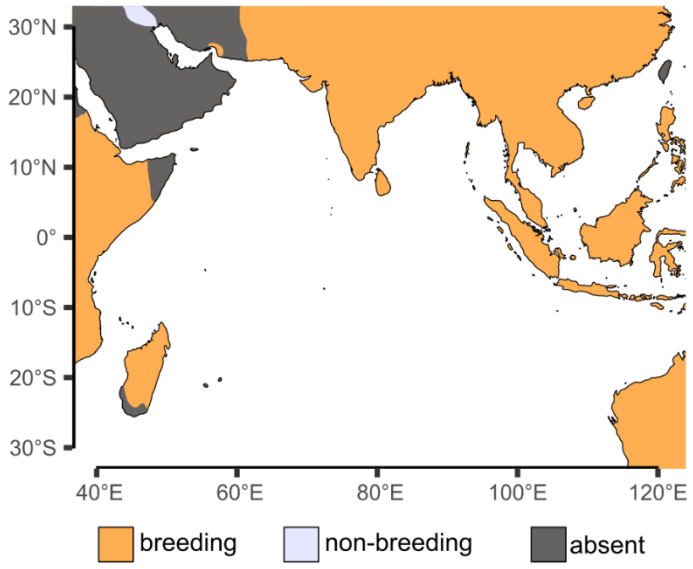


Figure 41: Indian Ocean-wide distribution map of Great Egret (Lagana; *Ardea alba*).

Non-breeding distribution: Undergoes substantial post-breeding migration, particularly juveniles dispersing several hundreds of kilometres within 1–2 months after fledging (McCrimmon Jr. *et al*., 2020). East Asian populations migrate to Southeast Asia and Philippines. Palearctic populations migrate to Middle East, Persian Gulf, Pakistan, occasionally further southward (Kushlan & Hancock, 2005).

6.2.11.4.Breeding biology

Average clutch	Incubation	Fledge	Nest	Diet
1–6 eggs	23–27 d	21–25 d	Woody vegetation over water	Fish, invertebrates, reptiles, amphibians

Timing: Breeding in the tropical range usually tied to rainfall (McCrimmon Jr. *et al*., 2020). Borneo: breeding May (Wong *et al*., 2012). Australia: breeding November to May (Kushlan & Hancock, 2005).

Nest site: Breeding habitat usually wetlands, both inland and along coast, including marshes, floodplains, lakeshores, ponds, saltpans, estuaries, coastal swamps, mangroves, mudflats (McCrimmon Jr. *et al*., 2020). Commonly nests in colonies with other herons. Nests built in woody vegetation, usually on top of shrubs, trees, mangroves, preferably over water (McCrimmon Jr. *et al*., 2020). Rarely also observed nesting on the ground or in reed grass (McCrimmon Jr. *et al*., 2020).

Clutch size: 1–6 eggs per clutch (McCrimmon Jr. *et al*., 2020).

Incubation period: 23–27 days (McCrimmon Jr. *et al*., 2020).

Fledging: Chicks begin climbing outside the nest 21–25 days after hatching (Dwyer, 1988). By 49–56 days after hatching, juveniles become able to fly (Dwyer, 1988; Pratt & Winkler, 1985), and independence from parents at 62–67 days after hatching (Wiese, 1976).

Breeding success: High variability in hatching success, depending on rainfall and resource availability, 3–87% hatching success (Pratt, 1972; Teal, 1965; Wiese, 1975).

Breeding cycle and interval: One brood per season but re-laying common when first brood lost (McCrimmon Jr. *et al*., 2020).

6.2.12. Grey Heron (Alhi maakanaa; *Ardea cinerea*)

IUCN status: Least Concern

Global population estimate: 500,000–2,500,000 birds
Global population trend: UNKNOWN

Table 21: Distribution of Grey Heron (Alhi maakanaa; *Ardea cinerea*) in the Maldives. Status: b = breeding; b? = breeding suspected; nb = non-breeding; - = absent/vagrant. If breeding is occurring, no information on non-breeding status is provided.

Area	Natural atoll	Administrative atoll	Status
North	Ihavandhippolhu	HA.	b
	Thiladunmathi	HA. + HDh.	b
	Makunudhoo	HDh.	b
	Miladhunmadulu	Sh. + N.	b
	North Maalhosmadulu	R.	b
	South Maalhosmadulu	B.	b
	Goifulhafehendhu	B.	b
	Faadhippolhu	Lh.	b
Central	Thoddu	AA.	b
	Ari	AA. + ADh.	b
	South Male	K.	b
	Felidhoo	V.	b
	North Nilandhoo	F.	b
	South Nilandhoo	Dh.	b
	Mulaku	M.	b
	Kolhumadulu	Th.	b
	Haddhunmathi	L.	b
South	Huvadhoo	GA. + GDh.	b
	Fuvahmulah	Gn.	b?
	Addu	S.	b

6.2.12.1.Situation in the Maldives

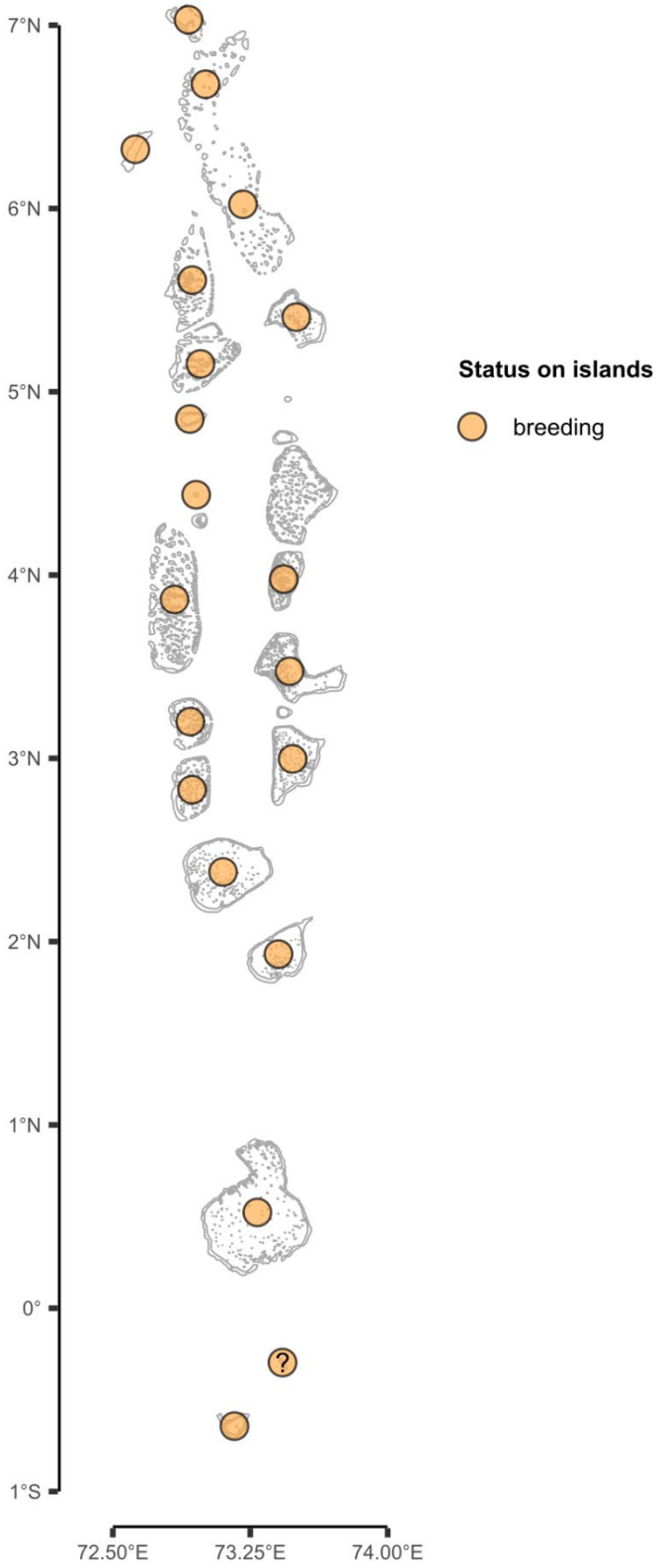
The Grey Heron (*Ardea cinerea*) breeds throughout the Maldives (Figure 42). It is known to nest on a variety of different tree species, including mangroves, Banyan trees (Nika gas; *Ficus benghalensis*), Screwpine (Kashikeyo; *Pandanus tectorius*), Coconut (Ruh; *Cocos nucifera*), and Coastal Ironwood (Kuredhi; *Pemphis acidula*). Interviewees sometimes linked the absence or disappearance of colonies to the presence of, and disturbance from, crows. Following a land reclamation project in Addu atoll, seagrass meadows dried out that were common foraging grounds for Grey Herons, and subsequently bird numbers declined.

Phillips (1964) reported the Grey Heron as plentiful and resident in all atolls and breeding. Ash and Shafeeg (1994) reported Grey Heron as plentiful and resident throughout the Maldives.

6.2.12.2.Atoll-level summary

Northern Maldives
Ihavandhippolhu: breeding in mangrove wetlands and on uninhabited islands.
Thiladunmathi: breeding in mangrove wetlands and on uninhabited islands.
Makunudhoo: estimated less than 10 birds, breeding on HDh. Fenboahuraa and HDh. Innafushi
Miladhunmadulu: breeding on Sh. Boduhuraa and Sh. Kudadhoo and in southern parts (Noonu) of the atoll, estimated 50 birds on Sh. Boduhuraa.
North Maalhosmadulu: breeding on R. Kan'doogan'du and rocky banks ('gaahuraa').
South Maalhosmadulu: breeding on B. Hanifaru and other uninhabited islands, estimated 15–20 birds.
Goifulhafehendhu: breeding, estimated 20–30 birds.
Faadhippolhu: breeding on Lh. Fehigili, Lh. Dhihdhoo, Lh. Felivaru, and Lh. Olhuvelifushi, estimated 10–15 birds.

Central Maldives
Thoddu: breeding, no more than 2–3 birds.
Ari: breeding, including on inhabited islands ADh. Dhigurah and ADh. Mandhoo.
South Male: breeding on K. Erruhhuraa.
Felidhoo: breeding on V. Anbaraa and V. Kuda Anbaraa.
North Nilandhoo: breeding, including in forested areas of inhabited island F. Nilandhoo and F. Bileiydhoo.
South Nilandhoo: breeding on uninhabited islands.
Mulaku: breeding on uninhabited islands.
Kolhumadulu: breeding on Th. Elaa and other uninhabited islands.
Haddhunmathi: breeding on L. Fonagaadhoo and other uninhabited islands.



Southern Maldives
Huvadhoo: breeding on GDh. Kafena and GDh. Futtahrah, and other uninhabited islands in northern (GA.) and southern (GDh.) parts of the atoll. Formerly more abundant.
Fuvahmulah: tentatively breeding around Fuvahmulah Nature Park wetland areas.
Addu: breeding in Addu Nature Park Eedhigali Kilhi area, estimated over 100 birds. Formerly more abundant.

Figure 42: Distribution of Grey Heron (Alhi maakanaa; *Ardea cinerea*) in the Maldives. When breeding is occurring on an atoll, no information on roosting is provided. If only roosting is indicated, it means that no breeding is known to occur in the atoll.

6.2.12.3.Indian Ocean distribution

Breeding distribution:

India, Sri Lanka, Lakshadweep, Maldives, Madagascar, Africa, Seychelles, China, throughout southeast Asia, Indomalayan region, Australia (Martínez-Vilalta *et al*., 2020b) (Figure 43).

Non-breeding distribution: Largely identical to breeding distribution. Populations of Africa, India, and southeast Asia sedentary (Martínez-Vilalta *et al*., 2020b).

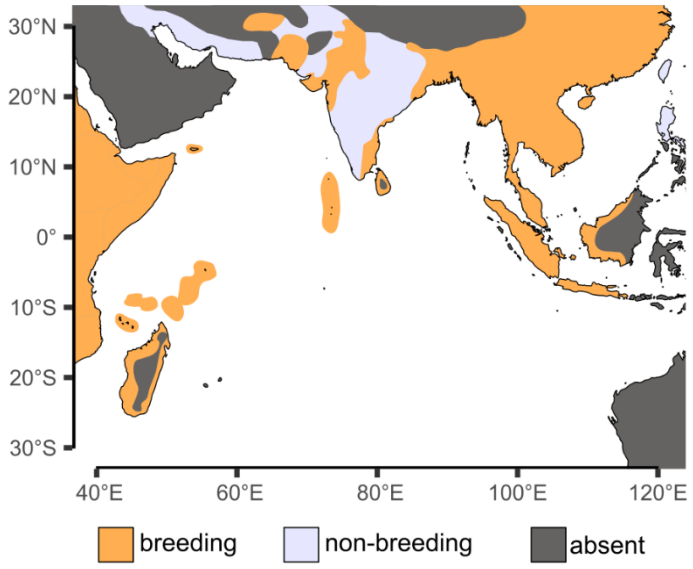


Figure 43: Indian Ocean-wide distribution map of Grey Heron (Alhi maakanaa; *Ardea cinerea*).

6.2.12.4.Breeding biology

Average clutch	Incubation	Fledge	Nest	Diet
1–10 eggs	21–28 d	10–20 d	Shallow water bodies with trees	Mainly fish

Timing: Breeding variable, mainly synchronised with rainy season (Martínez-Vilalta *et al*., 2020b). Madagascar: breeding April to December, with peaks April to May (Kushlan & Hancock, 2005). Northern India: breeding July to October; Southern India: breeding November to March (Kushlan & Hancock, 2005). Sumatra: breeding July to August (Kushlan & Hancock, 2005).

Nest site: Highly variable, any kind of shallow water body (freshwater, brackish, saltwater), standing water bodies and rivers/streams (Martínez-Vilalta *et al*., 2020b). Prefers areas with some trees. Nesting on ground or in trees (Martínez-Vilalta *et al*., 2020b). Nest is a platform built from sticks, but may also use reeds, herbaceous plants, and seagrass (Kushlan & Hancock, 2005).

Clutch size: 1–10 eggs per clutch, rarely re-laying egg after loss of brood (Safford & Hawkins, 2013).

Incubation period: 21–28 days, exceptionally up to 32 days, but in tropics considered to be generally shorter (e.g. in Seychelles: 21 days) (Snow *et al*., 1998).

Fledging: Chicks hatch asynchronously and remain at nest 10–20 days after hatching (Kushlan & Hancock, 2005). Sibling competition and aggression leads to smaller chicks not surviving, especially when food shortages occur (Kushlan & Hancock, 2005).

Breeding success: Relative success strongly influenced by food availability (Kushlan & Hancock, 2005), but chicks also known to be susceptible to predators incl. raptors and crows (Martínez-Vilalta *et al*., 2020b). Hatching success 80% and subsequent fledging success 78% in Northern Iran population (Ashoori *et al*., 2009).

Breeding cycle and interval: Sexual maturity reached within three years, but first-year birds may sometimes attend colonies (Kushlan & Hancock, 2005).

6.3. Waterbirds (Rails, ducks, pelicans)

6.3.1. Overview

Waterbirds are a group of bird species that are associated with brackish- and/or freshwater habitats. In the Maldives, the waterbirds guild comprises rails (Rallidae), ducks (Anatidae), and pelicans (Pelecanidae).

A total of 11 species in the waterbird guild are protected under EPA regulation in the Maldives (Table 22). Of these, three breed in the Maldives (incl. one tentatively breeding), while the other eight only migrate seasonally or infrequently to the Maldives during non-breeding season.

One waterbird species, the White-breasted Waterhen ('Kanbili'), occurs throughout the Maldives, on almost every island, and thus is also recognised as the national bird of the Maldives. Two waterbird species only occur on a few atoll islands, while the occurrence of the other eight species is not resolved. Anderson and Shimal (2020) list two species as common in the Maldives, six as uncommon, one as rarely occurring, and another two only occurring as vagrants.

Table 22: Waterbird species in the Maldives. Status in the Maldives based on Anderson and Shimal (2020). Green cells indicate where birds met the shortlisting criteria, and detailed species-level assessment data was obtained by interviews. Based on a short-listing by breeding status, distribution, and occurrence within the Maldives, a detailed assessment of three waterbird species in the Maldives was conducted through the interview process. LC = Least Concern.

English name	Dhivehi name	IUCN status	Breeding status	Distribution status	Occurrence status
White-breasted Waterhen	Kanbili	LC	Yes	Widespread	Common
Eurasian Moorhen	Kulhee kukulhu	LC	Yes	Localised	Common
Watercock	Valu kukulhu	LC	Yes(?)	Localised	Uncommon
Northern Pintail	Ilifathi reyru	LC	No	?	Uncommon
Green-winged Teal	Kurehi reyru	LC	No	?	Uncommon
Tufted Duck	Odi reyru	LC	No	?	Uncommon
Northern Shoveler	Samsa reyru	LC	No	?	Uncommon
Garganey	Kunburu reyru	LC	No	?	Uncommon
Ferruginous Duck	Rathu reyru	LC	No	?	Rare
Spot-billed Pelican	Alhi girunbaa dhooni	NT	No	?	Rare

English name	Dhivehi name	IUCN status	Breeding status	Distribution status	Occurrence status
Eurasian Coot	Salvaa dhooni	LC	No	?	Vagrant
Fulvous Whistling-duck	Reyru	LC	No	?	Vagrant

6.3.2. Ecological background

6.3.2.1. General breeding and non-breeding habitat of waterbirds

Waterbirds in the tropics rely on a variety of wetland habitats for both breeding and non-breeding purposes (Kear, 2004). During the breeding season, they prefer dense vegetation in marshes, swamps, and flooded grasslands. Rails, for example, often build nests in hidden locations within reeds or tall grasses to protect their eggs and chicks from predators (Taylor, 1998). Ducks typically nest near water, using shrubs, ground cover, or even tree cavities for breeding sites (Kear, 2004). These areas are chosen for their proximity to food and safety from disturbance.

Outside the breeding season, many tropical waterbird species move to more open and expansive wetlands, such as lakes, lagoons, and estuaries, where food is abundant (Weller, 1999). These non-breeding habitats provide the resources they need to replenish energy and moult feathers, a process critical for maintaining their ability to fly (Weller, 1999). Seasonal changes, such as the onset of rains, often create temporary wetlands that are quickly exploited by waterbirds as feeding and resting areas.

Waterbirds are highly adaptable and can thrive in human-modified environments, such as rice fields and irrigation canals but also parks and garden areas, as long as these offer sufficient food, shelter, and low levels of disturbance (Weller, 1999).

6.3.2.2. General migration patterns and timings of waterbirds

Waterbirds in the tropics exhibit diverse migration patterns that are often influenced by seasonal changes in water availability and food resources (Corriveau *et al*., 2020; Roshier *et al*., 2001; Teitelbaum & Mueller, 2019). Unlike waterbirds in temperate regions, which often undertake long-distance migrations between breeding and wintering grounds (particularly ducks, geese, and swans), many tropical species engage in shorter, more localized movements (McEvoy *et al*., 2015). These movements are typically timed to coincide with the rainy season, when wetlands are most productive and provide abundant food and breeding sites (Czech & Parsons, 2002; Kear, 2004). Rails are generally considered more sedentary, but some species can also undergo long-distance migrations (Lislevand *et al*., 2020).

During the breeding season, waterbirds migrate to areas with newly flooded wetlands. These habitats offer ideal conditions for breeding and raising young. As the rainy season ends and wetlands begin to dry up, these birds often disperse to more permanent water bodies, such as lakes, rivers, or coastal lagoons, where they can find food and shelter during the non-breeding season (Kear, 2004).

Some species, like the whistling ducks (*Dendrocygninae* spp.), are known for partial migrations, with only certain populations moving between regions (Kear, 2004). Others, like certain rail species, are highly secretive and may appear or disappear from wetlands unpredictably, depending on local conditions (Taylor, 1998).

6.3.2.3. General diet of waterbirds

Waterbirds have diverse diets that reflect the variety of habitats they occupy. Most of these birds are omnivorous, meaning they eat both plant and animal material, and their diet often depends on what is readily available in their environment (Kear, 2004).

Rails, for example, feed on seeds, insects, small fish, and snails. They are often found foraging in dense vegetation or mudflats, using their sharp bills to pick through the ground or shallow water (Taylor, 1998). Ducks and geese primarily consume aquatic plants, seeds, and grains, but many species also eat insects, crustaceans, and small fish, especially during the breeding season when they need extra protein (Kear, 2004).

Some waterbirds, like coots, are skilled divers, searching underwater for submerged vegetation and small prey (Winkler *et al*., 2020). Others, like whistling ducks, graze on grasses and seeds in flooded fields or along wetland edges (Kear, 2004). Waterbirds are opportunistic feeders, adapting their diet to seasonal changes in food availability. For example, during the rainy season, they often take advantage of the abundance of insects and other invertebrates found in newly flooded areas.

6.3.2.4. General monitoring methods for waterbirds

The most common method for assessing breeding population sizes is direct nest surveys, where nests in wetlands are counted during breeding or migration seasons (Kear, 2004; Taylor, 1998). These surveys often involve walking through wetlands or using boats to cover larger areas. For secretive species like rails, audio playback of their calls is used to encourage birds to respond, making it easier to detect them (Conway & Gibbs, 2005).

Another important technique is ringing birds. Lightweight metal or coloured plastic rings are attached to their legs, allowing tracking of their movements when the birds are re-sighted or recaptured (Peach *et al*., 1999). For waterbird and (partially) migratory species, advanced tracking devices, such GPS transmitters, can be used

to study migration routes, habitat use, and daily movements (Casazza *et al*., 2021; McDuie *et al*., 2019).

Nest monitoring can be done to study breeding success (Rönkä *et al*., 2011). This involves locating nests and recording data on eggs, chicks, and potential threats, such as predators or flooding. In some cases, remote cameras are placed near nests to gather detailed observations such as on causes of nest failure without disturbing the birds (Ellis-Felege & Carroll, 2012).

Wetland habitat assessments are also essential for monitoring. Water quality, vegetation cover, and food availability can be measured to understand the health of habitats that waterbirds depend on (Zhang *et al*., 2021).

6.3.2.5. General threats

Waterbirds in the tropics, especially on islands, face numerous threats that endanger their survival (Green, 1996). Habitat loss is a major issue, as scarce wetlands are often drained or filled for agricultural use, urban development, or infrastructure projects (Junk, 2002; Quesnelle *et al*., 2013). This reduces the areas where these birds can breed, feed, and rest. On islands, where space is already limited, habitat destruction can be particularly devastating.

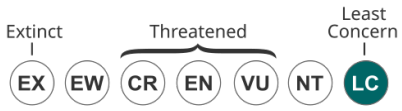
Introduced predators, such as rats and cats, are another significant threat, especially to ground-nesting species like rails (Harper & Bunbury, 2015; O'Donnell *et al*., 2015). These predators often prey on eggs, chicks, and even adult birds, and can cause rapid population decline. Invasive plants can also degrade wetland habitats by altering water flow or outcompeting native vegetation that provides food and shelter (Gagnon Lupien *et al*., 2015).

Climate change poses additional challenges (Şekercioğlu *et al*., 2012). Shifting rainfall patterns may lead to important habitats drying out or create conditions unsuitable for breeding (Zhang *et al*., 2024). Extreme weather events, like cyclones, can destroy nests and displace birds from their habitats (Thiyagesan & Nagarajan, 1997).

Hunting and trapping for food or trade also threaten many waterbird species (Green, 1996). Pollution, such as pesticides and oil spills, can contaminate wetlands and poison birds or their food sources (Long *et al*., 2007).

6.3.3. Eurasian Moorhen (Kulhee kukulhu; *Gallinula chloropus*)

IUCN status: Least Concern



Global population estimate: 2,900,000–6,200,000 birds
Global population trend: STABLE

Table 23: Distribution of Eurasian Moorhen (Kulhee kukulhu; *Gallinula chloropus*) in the Maldives. Status: b = breeding; b? = breeding suspected; nb = non-breeding; - = absent/vagrant. If breeding is occurring, no information on non-breeding status is provided.

Area	Natural atoll	Administrative atoll	Status
North	Ihavandhippolhu	HA.	-
	Thiladunmathi	HA. + HDh.	b
	Makunudhoo	HDh.	-
	Miladhunmadulu	Sh. + N.	b
	North Maalhosmadulu	R.	-
	South Maalhosmadulu	B.	-
	Goifulhafehendhu	B.	b?
	Faadhippolhu	Lh.	-
Central	Thoddu	AA.	-
	Ari	AA. + ADh.	-
	South Male	K.	-
	Felidhoo	V.	-
	North Nilandhoo	F.	-
	South Nilandhoo	Dh.	-
	Mulaku	M.	-
	Kolhumadulu	Th.	-
	Haddhunmathi	L.	-
South	Huvadhoo	GA. + GDh.	-
	Fuvahmulah	Gn.	b
	Addu	S.	b

6.3.3.1. Situation in the Maldives

The Eurasian Moorhen (*Gallinula chloropus*) is a secretive rail species that is locally present in the northern and southern Maldives (Figure 44). Its occurrence on islands is closely linked to the presence of wetlands. It appears to be a relatively common breeding species in the Fuvahmulah Nature Park wetland areas, but small population also exist in Addu Nature Park, on HDh. Kulhudhuffushi, albeit less abundant than in the past, on N. Ken'dhikulhudhoo, and on a few other large islands in the northern Maldives with extensive wetland areas. On Fuvahmulah atoll, the Eurasian Moorhen is targeted by poachers.

Phillips (1964) did not mention the Eurasian Moorhen. Ash and Shafeeg (1994) reported breeding of Eurasian Moorhen exclusively on Fuvahmulah atoll, while no additional records exist from any other atoll.

6.3.3.2. Atoll-level summary

Northern Maldives
Ihavandhippolhu: not observed.
Thiladunmathi: formerly common, nowadays very rare. Breeding in the wetlands on HDh. Kulhudhuffushi, but less abundant than in the past.
Makunudhoo: very rarely observed.
Miladhunmadulu: breeding on N. Ken'dhikulhudhoo and other islands with wetlands.
North Maalhosmadulu: not observed.
South Maalhosmadulu: not observed.
Goifulhafehendhu: suspected breeding in the wetland area (Kulhi) on B. Goidhoo.
Faadhippolhu: not observed.

Central Maldives
Thoddu: not observed.
Ari: not observed.
South Male: not observed.
Felidhoo: not observed.
North Nilandhoo: not observed.
South Nilandhoo: not observed.
Mulaku: not observed.
Kolhumadulu: not observed.
Haddhunmathi: not observed.

Southern Maldives
Huvadhoo: not observed.
Fuvahmulah: breeding in Fuvhamulah Nature Park wetland areas.
Addu: breeding in Addu Nature Park wetland area, wetland area nearby Addu Equatorial Hospital (Medheaari Kilhi), and Maa Kilhi.

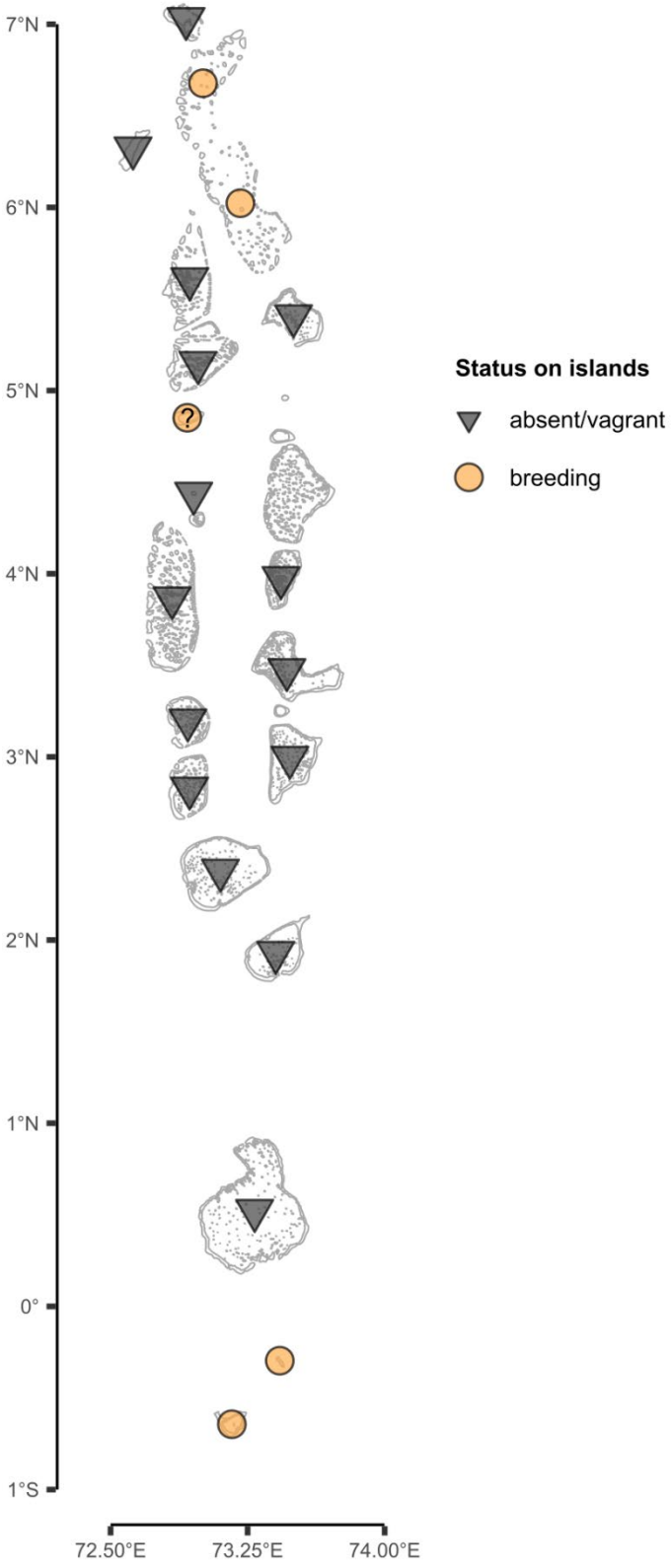


Figure 44: Distribution of Eurasian Moorhen (Kulhee kukulhu; *Gallinula chloropus*) in the Maldives. When breeding is occurring on an atoll, no information on roosting is provided. If only roosting is indicated, it means that no breeding is known to occur in the atoll.

6.3.3.3. Indian Ocean Distribution

Breeding distribution:

Comoros, Madagascar, Réunion, Mauritius, Seychelles, Andaman and Nicobar Islands, Chagos, Thai-Malay peninsula, Indomalayan region, Philippines, India, Sri Lanka, China (Taylor *et al*., 2020) (Figure 45).

Non-breeding distribution: Mostly sedentary throughout its distribution range, but northern populations migrate south. During northern-hemisphere winter, large number of birds from unknown origin arrive in Indian subcontinent (Taylor *et al*., 2020).

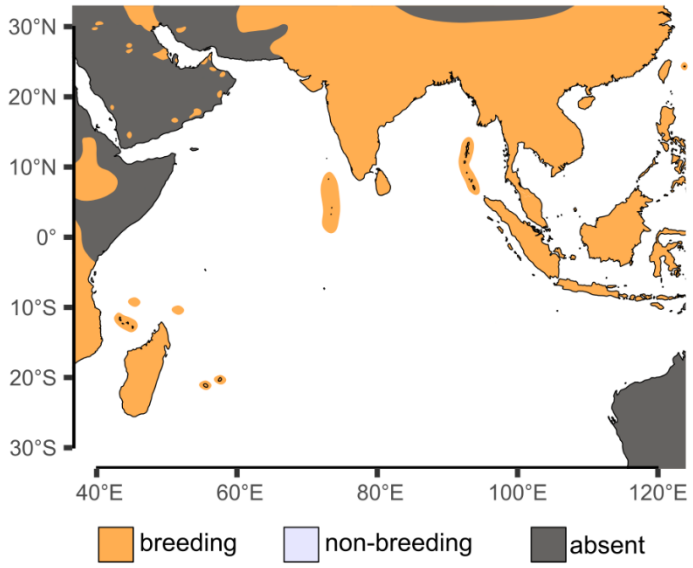


Figure 45: Indian Ocean-wide distribution map of Eurasian Moorhen (Kulhee kukulhu; *Gallinula chloropus*).

6.3.3.4. Breeding biology

Average clutch	Incubation	Fledge	Nest	Diet
3–9 eggs	17–22 d	45–50 d	In vegetation near water sources	Omnivorous

Timing: In the tropics year-round breeding but peaking in months of highest rainfall (Taylor *et al*., 2020). Madagascar: breeding October to March (Taylor *et al*., 2020). Indian subcontinent: breeding March to September (Taylor *et al*., 2020). Philippines: breeding July to September (Taylor *et al*., 2020).

Nest site: Breeding habitat a wide range of natural and artificial fresh- to brackish water wetlands with fringing vegetation; swamps, marshes, lakes, ponds, rice fields (Taylor *et al*., 2020). Nest a saucer-shaped cup from twigs, reeds, sedges, from 0–1 m above water, nest dimensions 24–30 cm (Taylor *et al*., 2020). Often built in emergent vegetation, but sometimes also floating nests, less often breeding on ground in vegetation, occasionally in shrubs and trees up to 8 m above ground (Taylor *et al*., 2020).

Clutch size: 3–9 eggs per clutch (Taylor *et al*., 2020).

Incubation period: 17–22 days (Taylor *et al*., 2020).

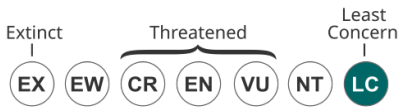
Fledging: Hatchlings remain in nest for 1–2 days, leave nest by third day and fully capable of diving after 8 days. Becomes self-feeding at 21–25 days. Fledging at 45–50 days after hatching (Taylor *et al*., 2020).

Breeding success: 91% hatching success and 89% fledging success in a breeding population in northern Iran (Amininasab *et al*., 2021). 51–70% total breeding success (eggs to fledging) in a breeding population in Algeria (Meniaia *et al*., 2014).

Breeding cycle and interval: Can rear up to three broods per season, with 20–30 day intervals between broods (Taylor *et al*., 2020). First breeding after one year old (Taylor *et al*., 2020).

6.3.4. Watercock (Valu kukulhu; *Gallicrex cinerea*)

IUCN status: Least Concern



Global population estimate: UNKNOWN
Global population trend: DECREASING

Table 24: Distribution of Watercock (Valu kukulhu; *Gallicrex cinerea*) in the Maldives. Status: b = breeding; b? = breeding suspected; nb = non-breeding; - = absent/vagrant. If breeding is occurring, no information on non-breeding status is provided.

Area	Natural atoll	Administrative atoll	Status
North	Ihavandhippolhu	HA.	-
	Thiladunmathi	HA. + HDh.	-
	Makunudhoo	HDh.	-
	Miladhunmadulu	Sh. + N.	-
	North Maalhosmadulu	R.	-
	South Maalhosmadulu	B.	-
	Goifulhafehendhu	B.	-
	Faadhippolhu	Lh.	-
Central	Thoddu	AA.	-
	Ari	AA. + ADh.	-
	South Male	K.	-
	Felidhoo	V.	-
	North Nilandhoo	F.	-
	South Nilandhoo	Dh.	-
	Mulaku	M.	b
	Kolhumadulu	Th.	-
	Haddhunmathi	L.	-
South	Huvadhoo	GA. + GDh.	-
	Fuvahmulah	Gn.	-
	Addu	S.	b

6.3.4.1. Situation in the Maldives

The Watercock (*Gallicrex cinerea*) is a locally occurring breeding species on Addu atoll (Figure 46). On some other atolls, it has been infrequently observed - suggesting it is, or formerly was, more widespread.

Phillips (1964) reports the Watercock as resident in the northern atolls. Ash and Shafeeg (1994) reports the Watercock as an uncommon resident or breeding visitor.

6.3.4.2. Atoll-level summary

Northern Maldives
Ihavandhippolhu: not observed.
Thiladunmathi: formerly present (ca. 10–15 years ago), not anymore.
Makunudhoo: not observed.
Miladhunmadulu: infrequently observed.
North Maalhosmadulu: once observed ca. 15 years ago.
South Maalhosmadulu: not observed.
Goifulhafehendhu: not observed.
Faadhippolhu: not observed.

Central Maldives
Thoddu: not observed.
Ari: formerly present but not observed for 30 years.
South Male: not observed.
Felidhoo: not observed.
North Nilandhoo: once observed ca. 10 years ago.
South Nilandhoo: not observed.
Mulaku: infrequently observed breeding on M. Mulah.
Kolhumadulu: infrequently observed.
Haddhunmathi: infrequently observed.

Southern Maldives
Huvadhoo: infrequently observed.
Fuvahmulah: not observed, but 30 years ago occasionally seen.
Addu: breeding in the wetland areas (Medheaari Kilhi) on S. Hithadhoo.

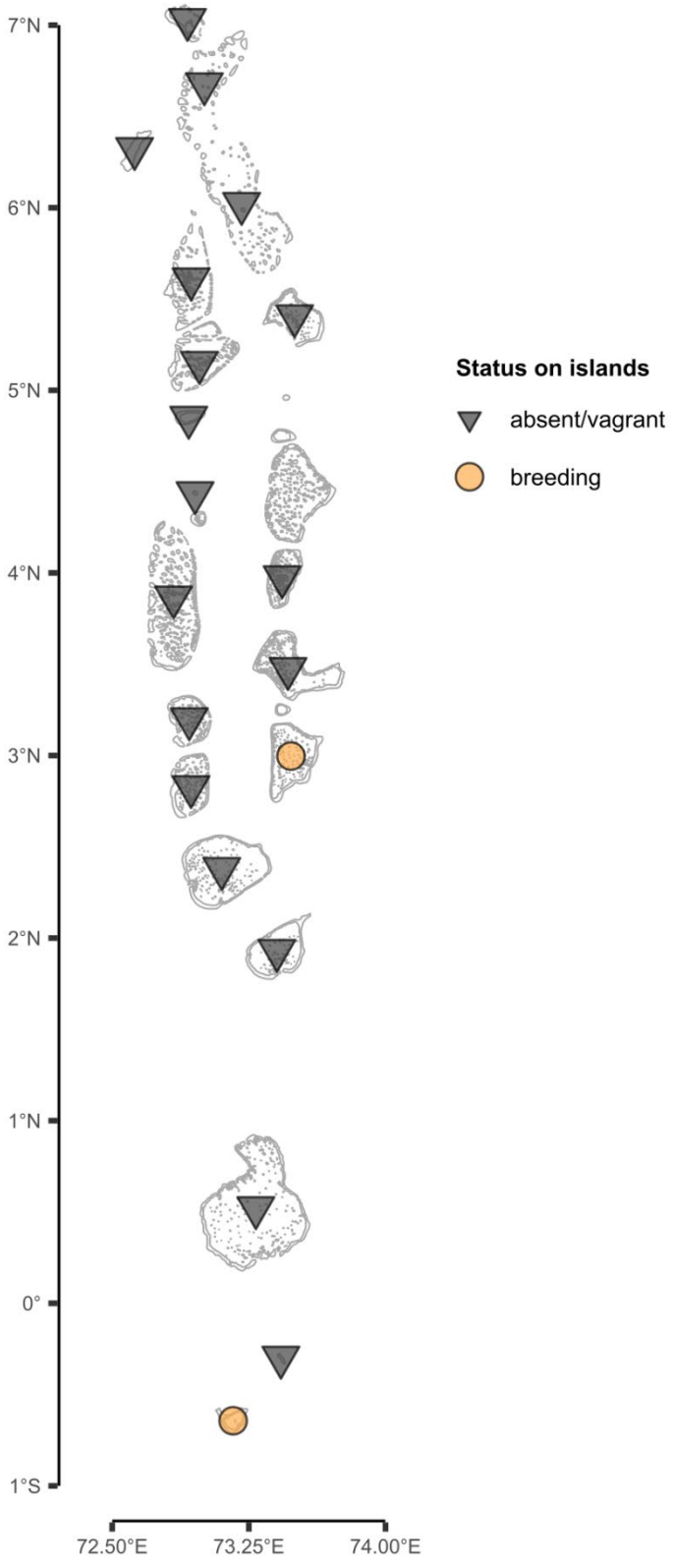


Figure 46: Distribution of Watercock (Valu kukulhu; *Gallicrex cinerea*) in the Maldives. When breeding is occurring on an atoll, no information on roosting is provided. If only roosting is indicated, it means that no breeding is known to occur in the atoll.

6.3.4.3. Indian Ocean distribution

Breeding distribution:

Pakistan, India, Sri Lanka, Central to Eastern China, Andaman and Nicobar Islands, Southeast Asia, Indomalayan region, Philippines, populations in the Maldives (Taylor & Kirwan, 2020) (Figure 47).

Non-breeding distribution: Birds in northern populations migrate to southern parts of its distribution range, otherwise sedentary or undergoing irregular post-breeding movements (Taylor & Kirwan, 2020).

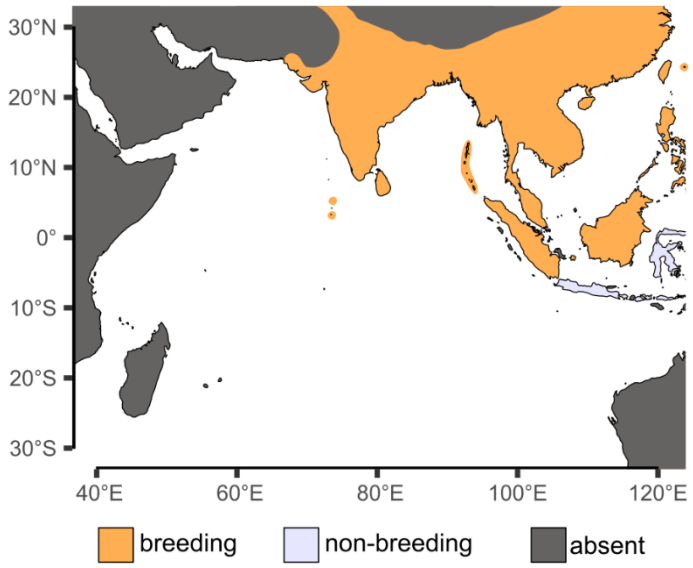


Figure 47: Indian Ocean-wide distribution map of Watercock (Valu kukulhu; *Gallicrex cinerea*).

6.3.4.4. Breeding biology

Average clutch	Incubation	Fledge	Nest	Diet
3–6 eggs	24 d	?	Reedy and grassy swamps	Omnivorous

Timing: Timing of breeding mostly synced to monsoon months (Taylor & Kirwan, 2020). India: breeding June to September (Taylor & Kirwan, 2020). Pakistan: breeding June to September (Taylor & Kirwan, 2020). Sri Lanka: breeding May, also January to February (Taylor & Kirwan, 2020). Philippines: breeding May to July (Taylor & Kirwan, 2020).

Nest site: Breeding habitat in reed grass areas, grassy swamps, flooded pasture, rice fields, ponds, sometimes also in brackish swamps. Nest a large and deep cup-shaped pad of sedges, rushes or grasses, built low down in reeds or on tussocks of coarse grass (Taylor & Kirwan, 2020).

Clutch size: 3–6 eggs per clutch (Taylor & Kirwan, 2020).

Incubation period: 24 days (Taylor & Kirwan, 2020).

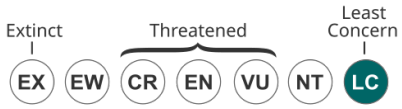
Fledging: Information not available/known.

Breeding success: Information not available/known.

Breeding cycle and interval: Normally two broods per season.

6.3.5. White-breasted Waterhen (Kanbili; *Amaurornis phoenicurus*)

IUCN status: Least Concern



Global population estimate: UNKNOWN
Global population trend: UNKNOWN

Table 25: Distribution of White-breasted Waterhen (Kanbili; *Amaurornis phoenicurus*) in the Maldives. Status: b = breeding; b? = breeding suspected; nb = non-breeding; - = absent/vagrant. If breeding is occurring, no information on non-breeding status is provided.

Area	Natural atoll	Administrative atoll	Status
North	Ihavandhippolhu	HA.	b
	Thiladunmathi	HA. + HDh.	b
	Makunudhoo	HDh.	b
	Miladhunmadulu	Sh. + N.	b
	North Maalhosmadulu	R.	b
	South Maalhosmadulu	B.	b
	Goifulhafehendhu	B.	b
	Faadhippolhu	Lh.	b
Central	Thoddu	AA.	b
	Ari	AA. + ADh.	b
	South Male	K.	b
	Felidhoo	V.	b
	North Nilandhoo	F.	b
	South Nilandhoo	Dh.	b
	Mulaku	M.	b
	Kolhumadulu	Th.	b
	Haddhunmathi	L.	b
South	Huvadhoo	GA. + GDh.	b
	Fuvahmulah	Gn.	b
	Addu	S.	b

6.3.5.1. Situation in the Maldives

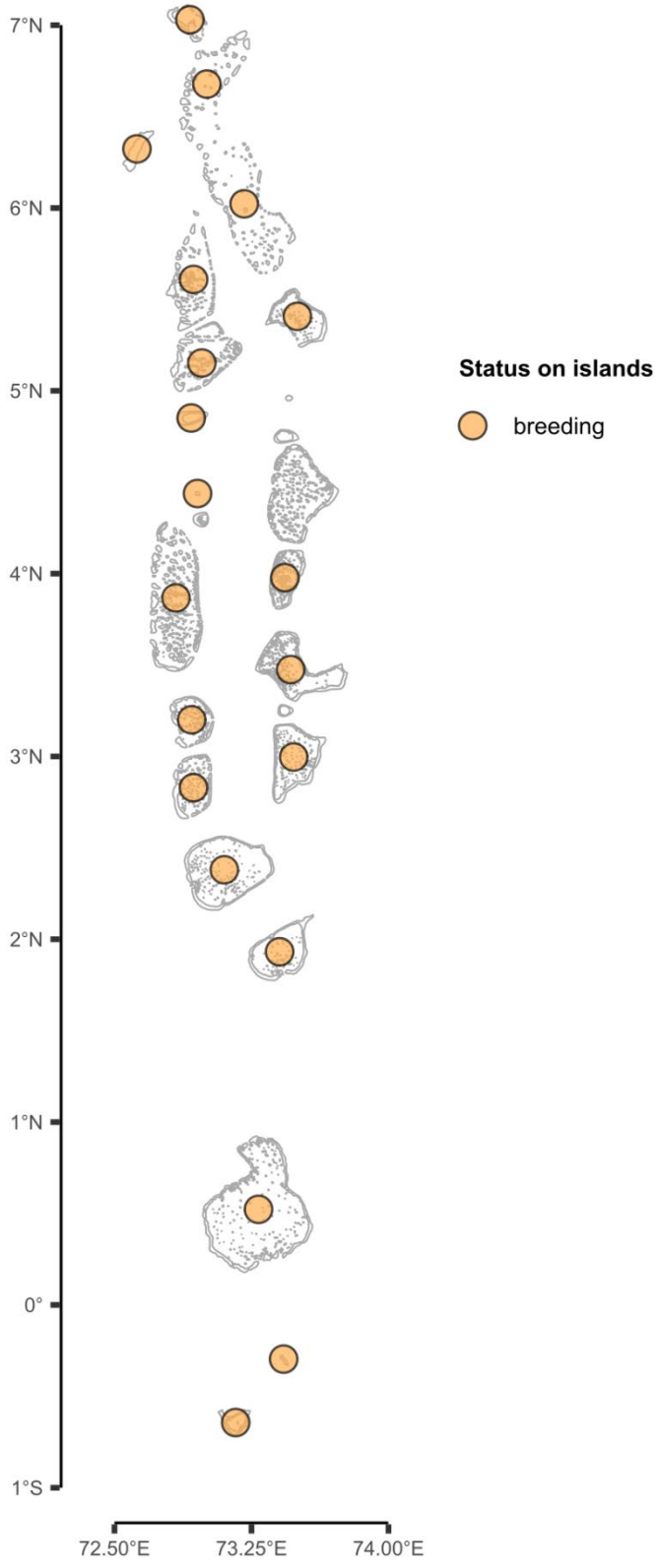
The White-breasted Waterhen is the national bird of the Maldives. It is a widespread breeding resident (Figure 48), although interviewees indicated repeatedly a decline or entire disappearance of the species from some islands. The decline was consistently attributed to deforestation on local islands and the loss of natural forest habitat. Interviewees stated they hear fewer calls while others noted that birds are coming much more regularly into inhabited and agricultural areas as their natural forest habitat is disappearing. On more heavily urbanised islands, such as in South Male atoll, the White-breasted Waterhen has almost vanished entirely. Interviewees estimated between 2–3, sometimes 7–8, and sometimes as much as 10–20 birds per island, likely depending on the size of the island and available suitable forest and shrubland habitat. One interviewee further noted that White-breasted Waterhens were commonly caught by children as a game in the past, but this is no longer practiced in their community.

Phillips (1964) reported the White-breasted Waterhen as widespread and noted plentiful breeding. Ash and Shafeeg (1994) reported the White-breasted Waterhen as a widespread resident in all atolls.

6.3.5.2. Atoll-level summary

Northern Maldives
Ihavandhippolhu: widespread breeding.
Thiladunmathi: widespread breeding throughout northern (HA.) and southern (HDh.) parts of the atoll. Formerly more abundant.
Makunudhoo: widespread breeding. Formerly more abundant.
Miladhunmadulu: widespread breeding. Formerly more abundant.
North Maalhosmadulu: widespread breeding.
South Maalhosmadulu: widespread breeding.
Goifulhafehendhu: widespread breeding.
Faadhippolhu: widespread breeding. Formerly more abundant.

Central Maldives
Thoddu: breeding.
Ari: widespread breeding.
South Male: present in small numbers on islands with vegetation, but formerly more abundant.
Felidhoo: widespread breeding.
North Nilandhoo: widespread breeding.
South Nilandhoo: widespread breeding.
Mulaku: widespread breeding.
Kolhumadulu: widespread breeding.
Haddhunmathi: widespread breeding.



Southern Maldives
Huvadhoo: widespread breeding.
Fuvahmulah: widespread breeding. Formerly more abundant.
Addu: widespread breeding.

Figure 48: Distribution of White-breasted Waterhen (Kanbili; *Amaurornis phoenicurus*) in the Maldives. When breeding is occurring on an atoll, no information on roosting is provided. If only roosting is indicated, it means that no breeding is known to occur in the atoll.

6.3.5.3. Indian Ocean Distribution

Breeding distribution:

Pakistan, India, Maldives, Sri Lanka, China, Taiwan, Southeast Asia, Philippines, Indomalayan region, Christmas Island, Cocos-Keeling atoll, Andaman and Nicobar Islands (Taylor & Kirwan, 2020) (Figure 49).

Non-breeding distribution: Northern populations migrate to southern range of distribution. Resident throughout most of its distribution range (Taylor & Kirwan, 2020).

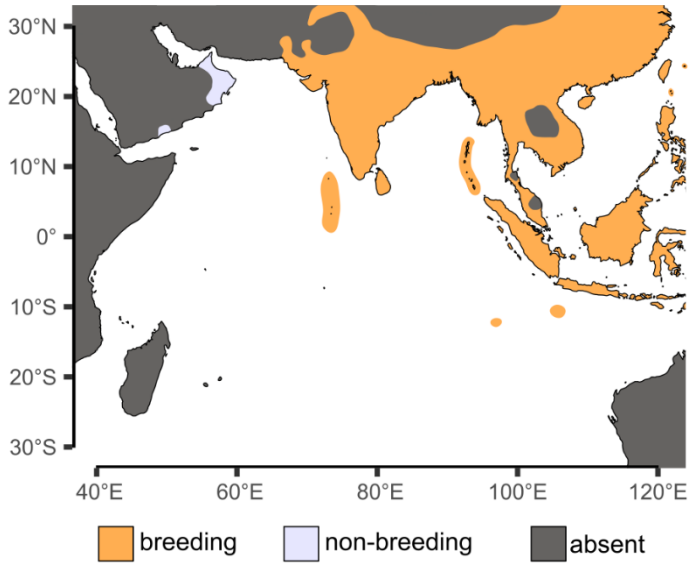


Figure 49: Indian Ocean-wide distribution map of White-breasted Waterhen (Kanbili; *Amaurornis phoenicurus*).

6.3.5.4. Breeding biology

Average clutch	Incubation	Fledge	Nest	Diet
4–9 eggs	20 d	Chicks leave within few days after hatching	Reedy or grassy swamps	Omnivorous

Timing: Breeding peaks synced with monsoon seasons but generally considered to breed year-round (Taylor & Kirwan, 2020). India: breeding June to October (Taylor & Kirwan, 2020). Andaman and Nicobar Islands: breeding June to July (Taylor & Kirwan, 2020).

Nest site: Breeding habitat reedy or grassy swamps, marshes, tall grass, shrubs, ponds, lake shores, dense forest with major understory vegetation, mangrove swamps. Nest a shallow cup-shaped pad of twigs and leaves, placed on ground in grass or undergrowth, generally concealed within shrub vegetation or *Pandanus* thicket (Taylor & Kirwan, 2020).

Clutch size: 4–9 eggs per clutch (Taylor & Kirwan, 2020).

Incubation period: 20 days (Taylor & Kirwan, 2020).

Fledging: Chicks leave nest soon after hatching (Taylor & Kirwan, 2020).

Breeding success: Information not available/known.

Breeding cycle and interval: Probably multiple broods per season.

6.4. Waders

6.4.1. Overview

Waders (or shorebirds) are a group of bird species that are commonly found along shorelines or mudflats where they forage for prey (Chandler, 2009). The majority of Asian waders nest over the Northern hemisphere summer in the tundra and taiga ecosystems of Siberia and the Russian arctic coast, but they annually migrate thousands of kilometres to the tropics for overwintering (Warnock *et al*., 2001). A small number of waders are also breeding in the tropical latitudes but still undertake sometimes large migratory journeys between their breeding and non-breeding habitats (Warnock *et al*., 2001).

A total of 18 wader species are protected under EPA regulation in the Maldives (Table 26). Of these, only one species was tentatively historically breeding in the Maldives, while the other 17 species only migrate seasonally or infrequently from the Siberian breeding grounds to the Maldives for overwintering.

Twelve wader species are widely occurring throughout the Maldives. One wader species occurs only localised on few islands in some atolls, while for the other 5 species the occurrence is not resolved. Anderson and Shimal (2020) listed three wader species as common in the Maldives, 10 species as uncommon, 2 species as rarely occurring, one species only occurring as a vagrant in the Maldives, and for 2 species the occurrence has not been resolved.

Table 26: Wader species in the Maldives. Status in the Maldives based on Anderson and Shimal (2020). Green cells indicate where birds met the shortlisting criteria, and detailed species-level assessment data was obtained by interviews. Based on a short-listing by breeding status, distribution, and occurrence within the Maldives, a detailed assessment of one wader species in the Maldives was conducted through the interview process. LC = Least Concern, NT = Near Threatened, CR = Critically Endangered.

English name	Dhivehi name	IUCN status	Breeding status	Distribution status	Occurrence status
Crab-plover	Theravaa, Moalhalunbo	LC	No (?)	Localised	uncommon
Ruddy Turnstone	Rathafai	LC	No	Widespread	common
Whimbrel	Bulhithumbi	LC	No	Widespread	common
Common Greenshank	Chonchon ilohi	LC	No	Widespread	common
Tibetan Sand-plover	Bondana	LC	No	Widespread	uncommon
Greater Sand-plover	Valu bondana	LC	No	Widespread	uncommon

English name	Dhivehi name	IUCN status	Breeding status	Distribution status	Occurrence status
Common Ringed Plover	Agothi bondana	LC	No	Widespread	Uncommon
Pacific Golden Plover	Bileymaa dhooni	LC	No	Widespread	Uncommon
Grey Plover	Alaka	LC	No	Widespread	Uncommon
Kentish Plover	Kiru bondana	LC	No	Widespread	Uncommon
Curlew Sandpiper	Bondana ilohi	NT	No	Widespread	Uncommon
Eurasian Curlew	Bodu bulhithumbi	NT	No	Widespread	Uncommon
Marsh Sandpiper	Furedhi ilohi	LC	No	Widespread	Uncommon
Black-tailed Godwit	Eshunga ilohi	NT	No	?	Vagrant
Sociable Lapwing	Adnhun bondana	CR	No	?	Rare
Black-winged Stilt	Theyravaa ilohi	LC	No	?	Rare
Jack Snipe		LC	No	?	?
American Golden Plover		LC	No	?	?

6.4.2. Ecological background

6.4.2.1. General breeding and non-breeding habitat of waders

Waders use distinct habitats for breeding and non-breeding seasons (Warnock *et al*., 2001). Many of these birds breed in the Palearctic, a vast region covering Europe, northern Asia, and parts of the Arctic (Cramp & Simmons, 1977). During the breeding season in the Northern hemisphere summer, they favour open tundra, grasslands, or wetlands, where the ground provides good camouflage for nesting season (Warnock *et al*., 2001). These habitats are rich in insects and other invertebrates during the summer, offering plenty of food to support egg-laying and raising chicks (Warnock *et al*., 2001).

As the breeding season ends and temperatures drop, waders migrate south for the non-breeding season (Cramp & Simmons, 1977). In tropical regions, they are commonly found in coastal mudflats, estuaries, lagoons, and mangroves, where they feed on small crustaceans, worms, and molluscs (Warnock *et al*., 2001). Some species also use inland habitats, such as flooded fields, lakeshores, and riverbanks (Warnock *et al*., 2001). These areas provide abundant food and favourable conditions for resting and refuelling during the months away from their breeding grounds (Warnock *et al*., 2001).

6.4.2.2. General migration patterns and timing of waders

Migration patterns vary between species but often follow well-established flyways, which are routes that connect breeding and wintering areas (Warnock *et al*., 2001). Major flyways for Palearctic waders include the Central Asian flyway, which crosses the Himalayas into the Indian subcontinent and further onward to Sri Lanka and the Maldives, and the East Asian-Australasian Flyway, which takes birds to Southeast Asia and Australasia (Warnock *et al*., 2001). These routes are supported by key stopover sites, such as estuaries and mudflats, where waders can rest and refuel before continuing their journey (Warnock *et al*., 2001).

The timing of migration is highly synchronized with seasonal changes. Most waders leave their breeding grounds in August to September, with juveniles often departing slightly later than adults (Chandler, 2009). The return migration begins in February to April, allowing birds to arrive at their breeding sites as food resources peak during the Arctic summer (Chandler, 2009). Some species, like the Common Sandpiper (*Actitis hypoleucos*), may make shorter journeys to tropical wetlands, while others, such as the Bar-tailed Godwit (*Limosa lapponica*), undertake extraordinary non-stop flights over open oceans (Battley *et al*., 2012).

In addition to the overwintering movements, over-summering is observed in some waders, particularly juveniles and non-breeding adults, that choose to remain in their tropical wintering grounds rather than migrating back to the Palearctic breeding sites during northern-hemisphere summer (Cramp & Simmons, 1977). This strategy is often seen in younger birds that are not yet ready to breed or in adults that may have insufficient energy reserves or have skipped breeding for the season (Chandler, 2009).

During the Northern hemisphere summer, these over-summering waders can be found in coastal mudflats, lagoons, and other wetland habitats in the tropics (Chandler, 2009). While the majority of their species migrate back to Arctic or northern regions to take advantage of the short but abundant breeding season, over-summering birds continue to forage and rest in their non-breeding grounds (Chandler, 2009).

The reasons behind over-summering vary. For younger birds, it is an opportunity to build strength and prepare for future migrations and breeding seasons. For some adults, it may be a way to recover from injuries or conserve energy during unfavourable conditions (Chandler, 2009). Over-summering is also influenced by environmental factors, such as food availability and habitat stability in tropical regions.

6.4.2.3. General diet of waders

Waders are primarily carnivorous, feeding on a wide variety of invertebrates found in wetland and coastal areas (Frederick, 2001).

During the non-breeding season in the tropics, waders forage in mudflats, estuaries, mangroves, along beaches, and shallow wetlands. They use their specialized bills to probe the soft mud or sand for hidden prey (Colwell, 2010). Long-billed species, like curlews and snipes, can reach deeper into the substrate to catch worms, molluscs, and crustaceans, while shorter-billed species, such as plovers, pick insects, small crabs, and other prey from the surface (Colwell, 2010).

Waders are highly opportunistic, adjusting their diet to the availability of local food sources (Colwell, 2010). In coastal areas, they often target small shellfish, shrimp, and tiny fish, while in inland wetlands, they feed on aquatic insects, larvae, and sometimes seeds or plant material (Colwell, 2010). This adaptability is crucial for their survival, as food availability can vary widely across different habitats and seasons (Colwell, 2010).

Feeding behaviours are often tailored to specific species and environments. For example, some waders, like redshanks, forage by sight, quickly scanning the surface for prey (Goss-Custard, 1977), while others, such as sandpipers, rely on touch, using sensitive tips of their bills to detect food buried in the substrate (Martin & Piersma, 2009).

6.4.2.4. General monitoring methods for waders

The most common method is bird counts, conducted at key sites like mudflats, estuaries, and wetlands (Robinson *et al*., 2005; Warnock *et al*., 1998). These areas are surveyed during migration seasons to record the number of individuals and identify species (Robinson *et al*., 2005). These counts provide important data on population trends and the health of habitats (Robinson *et al*., 2005).

Ringing and flagging is another widely used technique. Lightweight metal or coloured plastic bands and flags (sometimes with unique letters inscribed) are placed on a bird’s leg, allowing to track its movements and lifespan when it is sighted again, or evaluate site fidelity in breeding or overwintering habitats when observed in consecutive years (Peach *et al*., 1999). Advances in tracking technology have introduced devices like GPS tags. These devices provide detailed information on migration routes, stopover sites, and habitat use, revealing the challenges birds face during their journeys (Ewing *et al*., 2018; Scarpignato *et al*., 2016; Thomas *et al*., 2011).

International cooperation is essential for monitoring waders, as these birds migrate across continents (Davidson *et al*., 1999; Minton, 2005). Flagging of waders follows

international protocols. Data collected help identify key habitats, track population changes, and guide multi-national conservation actions (Davidson *et al*., 1999).

6.4.2.5. General threats

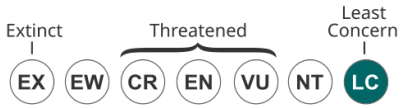
Habitat loss is one of the most significant dangers for these birds (Frederick, 2001). Wetlands, mudflats, and coastal areas, which are vital feeding and resting sites, are increasingly being drained or developed for agriculture, tourism, and urban expansion (West & Caldow, 2006). As these habitats disappear, waders lose the essential areas they rely on during migration and their overwintering time in the tropics (Goss-Custard *et al*., 1995).

Another major threat is disturbance from human activity. Increased tourism, boating, and development around coastal areas can cause birds to abandon their feeding grounds or breeding sites (Martín *et al*., 2015). Waders are sensitive to human presence, and disturbances can prevent them from resting or foraging effectively, leading to fatigue during their long migrations (Martín *et al*., 2015).

Pollution, including oil spills, pesticides, and agricultural runoff, can contaminate water sources and reduce the quality of feeding areas (Ma *et al*., 2022). This pollution can poison waders directly or harm the invertebrates they rely on for food (Ma *et al*., 2022).

6.4.3. Crab-plover (Theyravaa; *Dromas ardeola*)

IUCN status: Least Concern



Global population estimate: 34,800–46,300 birds
Global population trend: STABLE

Table 27: Distribution of Crab-plover (Theyravaa; *Dromas ardeola*) in the Maldives.
Status: b = breeding; b? = breeding suspected; nb = non-breeding; - = absent/vagrant.

Area	Natural atoll	Administrative atoll	Status
North	Ihavandhippolhu	HA.	-
	Thiladunmathi	HA. + HDh.	-
	Makunudhoo	HDh.	-
	Miladhunmadulu	Sh. + N.	-
	North Maalhosmadulu	R.	-
	South Maalhosmadulu	B.	-
	Goifulhafehendhu	B.	-
	Faadhippolhu	Lh.	-
Central	Thoddu	AA.	-
	Ari	AA. + ADh.	-
	South Male	K.	-
	Felidhoo	V.	-
	North Nilandhoo	F.	-
	South Nilandhoo	Dh.	-
	Mulaku	M.	-
	Kolhumadulu	Th.	-
	Haddhunmathi	L.	-
South	Huvadhoo	GA. + GDh.	-
	Fuvahmulah	Gn.	-
	Addu	S.	-

6.4.3.1. Situation in the Maldives

The Crab-plover used to be a very common and abundant bird throughout the Maldives, but it has now almost entirely disappeared (Figure 50). Its arrival and presence in the Maldives are linked to the strong winds at the beginning of the northeast monsoon season (Iruvai). Interviewees reported consistently the disappearance of Crab-plover within the last few decades (10–20 years ago, sometimes 30–40 years ago, depending on the atoll). The Crab-plover's disappearance was consistently related to the destruction and disturbance of sandbanks from dredging, land reclamation, sand mining, and resort development, but it was also stated that Crab-plovers were heavily poached and kept as pets in the past. Two interviewees noted that Crab-plover liked very clean places and would disappear from an island if there is just one footprint. Another interviewee noted that Crab-plovers were highly sensitive to light pollution, suggesting their disappearance is partly due to increase in light pollution. Interviewees from Haddhunmathi (L. Maabaidhoo) and Huvadhoo (GDh. Madaveli) atolls - both age 39 - mentioned that their parents and grandparents would speak about the abundance of Crab-plovers (several thousand birds) in the past, while they have never seen one.

One interesting account was made by a 59-year old interview partner from Th. Veymandhoo, Kolhumadulu atoll. The interviewee stated that hundreds of birds were present on sandbanks in the past, stating that birds would return to the islands at night and stating that they have an overall similar breeding habit as tropical shearwater – potentially referring to the unique burrowing behaviour of Crab-plovers. The interviewees from Mulaku and Kolhumadulu atolls also had a specific second name for the female Crab-plover in Dhivehi, 'Moalhavaa'. While most interviewees linked the former arrival of Crab-plover to the beginning of the northeast monsoon season, suggesting only overwintering in the Maldives, this account from Kolhumadulu atoll may fuel existing earlier speculations of potentially historical breeding of Crab-plover in the Maldives (Rands & Kirwan, 2020).

The entire disappearance of a formerly highly common and abundant bird species in the Maldives in the last 20–40 years is certainly an intriguing phenomenon that warrants further investigation. If Crab-plovers were never a breeding species in the Maldives, then their disappearance suggests the collapse of the breeding population(s) outside the Maldives that would visit the Maldives as overwintering site.

Phillips (1964) reports Crab-plovers as widespread and resident in small numbers, and suspects breeding in the more remote atolls. Ash and Shafeeg (1994) reports Crab-plovers as common and widespread and possibly breeding.

6.4.3.2. Atoll-level summary

Northern Maldives
Ihavandhippolhu: not observed.

Thiladunmathi: rarely observed on HA. Kelaa beach, no more than 1–2 birds, and at night on HA. Beenaafushi (Bibeerah). Not observed at all any more in 10–15 years in the southern parts of the atoll (HDh.).
Makunudhoo: very common in the past but not seen any more in 15–20 years.
Miladhunmadulu: a flock of 10–12 birds seen on Sh. Kanditheemu and roosting on Sh. Dhiguvelidhoo (Mairah). N. Than'burudhoo and N. Than'burudhu'faru used to be common roosting islands but not seen in nine years. Other accounts note that the birds had not been seen in 15–20 years.
North Maalhosmadulu: seen on uninhabited islands, sandbanks ('finolhuthah') and on beaches, but not seen in 10–12 years.
South Maalhosmadulu: infrequently observed on sandbanks ('finolhuthah'), estimated 5–10 birds.
Goifulhafehendhu: formerly present but not seen in 40 years.
Faadhippolhu: formerly common on sandbanks ('finolhuthah') but not seen in 10–20 years.

Central Maldives
Thoddu: formerly present but not seen any more.
Ari: very common and abundant in the past, but only rarely individual birds seen in the last 40 years.
South Male: formerly present but not seen any more.
Felidhoo: formerly present but not seen any more.
North Nilandhoo: formerly present but not seen in 20–30 years.
South Nilandhoo: observed infrequently in low numbers at the beginning of northeast monsoon season.
Mulaku: observed infrequently in low numbers at the beginning of northeast monsoon season.
Kolhumadulu: formerly very common and abundant on Th. Omadhoo, Th. Kin'bidhoo, Th. Dhiyamigili, Th. Veymandhoo and several other sandbanks ('finolhuthah'), but not seen in 40 years. Two birds sighted in 2024.
Haddhunmathi: formerly very common and abundant, but in the last 15 years only very rarely individual birds observed.

Southern Maldives
Huvadhoo: formerly very common and abundant, 10–12 years ago still 15–20 birds seen on some islands of the northern parts (GA.) of the atoll. In the southern parts (GDh.) of the atoll, 35–40 years ago about 30–40 birds, nowadays not seen.
Fuvahmulah: not observed.
Addu: formerly common but not seen in 10 years.

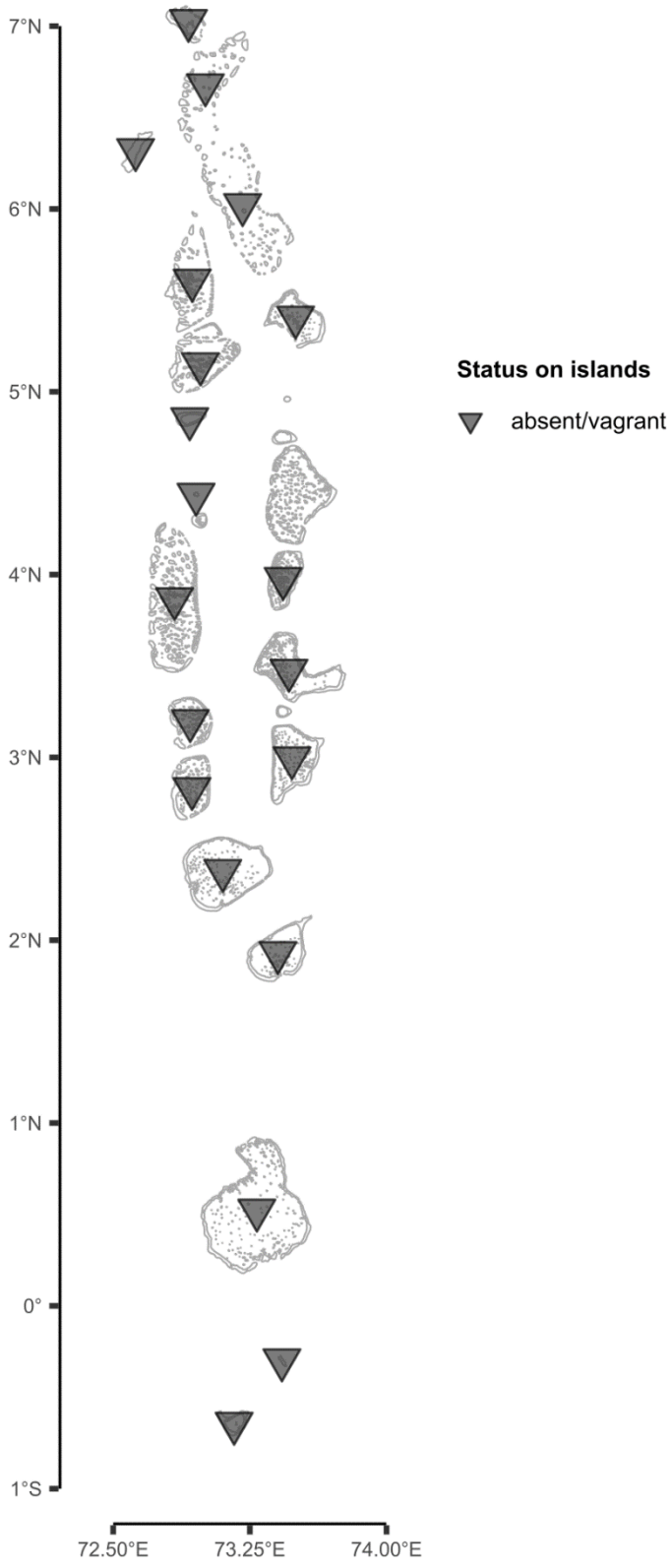


Figure 50: Distribution of Crab-plover (Theyravaa; *Dromas ardeola*) in the Maldives. When breeding is occurring on an atoll, no information on roosting is provided. If only roosting is indicated, it means that no breeding is known to occur in the atoll.

6.4.3.3. Indian Ocean Distribution

Breeding distribution:

Along coasts of north-western Indian Ocean, Persian Gulf, Red Sea (Rands & Kirwan, 2020) (Figure 51).

Non-breeding distribution:

Migrates regularly along African coast to Kenya, Tanzania, Madagascar, East and West Indian coast, Sri Lanka, Andaman Islands. In small numbers also overwintering along southwest Thailand coast. Known to overwinter on Western Indian Ocean atolls, incl. Cosmoledo, Aldabra, St Francois atolls in Seychelles (Rands & Kirwan, 2020).

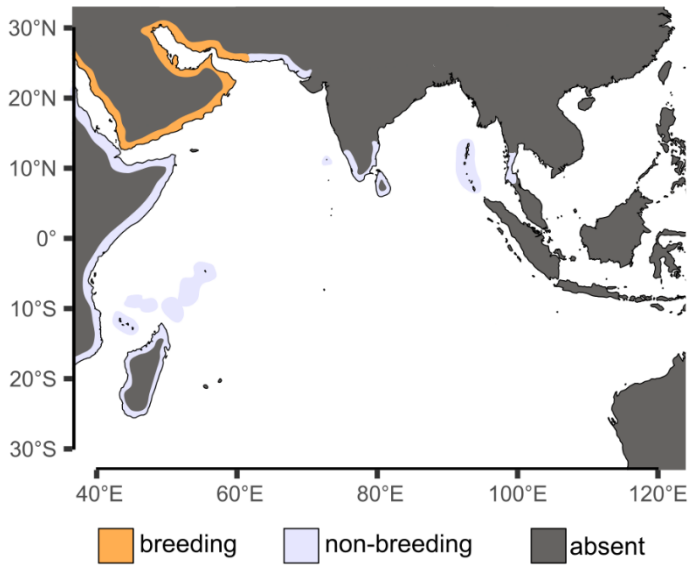


Figure 51: Indian Ocean-wide distribution map of Crab-plover (Theyravaa; *Dromas ardeola*).

6.4.3.4. Breeding biology

Average clutch	Incubation	Fledge	Nest	Diet
1 egg	32–33 d	Several months	Burrows on sandy coral islands	Crustaceans, molluscs, intertidal invertebrates

Timing: United Arab Emirates: breeding April to July (Jennings, 2010). Somalia: breeding May to June (Ash & Miskell, 1998). Eritrea: breeding early May (De Marchi *et al*., 2008).

Nest site: Breeding habitat on sandy coral islands with low (<0.5 m) halophytic vegetation, primarily nocturnal (De Marchi *et al*., 2008). Breeds colonially in burrows, up to 18 nests per 100 m², colonies frequently larger than 100 pairs although can be as little as 2–3 pairs per colony, and some pairs also breeding solitarily (Rands & Kirwan, 2020). Colonies often in proximity to productive feeding areas (De Marchi *et al*., 2008). Nest is a chamber 0.3–1.0 metre below ground, with a long 1.1–6.5 m long straight burrow entrance. Burrow opening ca. 15–16 cm x 18–20 cm (Rands & Kirwan, 2020).

Clutch size: 1 egg per clutch, rarely 2 (Rands & Kirwan, 2020).

Incubation period: 32–33 days (Rands & Kirwan, 2020).

Fledging: Fledgling remains at least partially dependent for several months until second year (De Sanctis *et al*., 2005; Jennings, 2010; Rands & Kirwan, 2020).

Breeding success: 66% total reproductive success in United Arab Emirates colony (2 out of 3 pairs fledging a young) (Jennings, 2010).

Breeding cycle and interval: Probably does not breed until age three (Chandler, 2009).

6.5. Land birds

6.5.1. Overview

Land birds are a large grouping of birds that are all associated with inland terrestrial habitats. The classification of 'land bird' in the context of oceanic islands is mostly used to delimit birds of the inland habitats from those widely occurring and breeding in the shoreline, such as waders and herons, or freshwater habitats, such as ducks and rails, or that spend most of their adult life at sea, i.e. seabirds. In the Maldives, land birds consist of perching birds (Passeriformes), cuckoos (Cuculidae), diurnal birds-of-prey (Accipitriformes), and falcons (Falconidae). On islands, land birds are generally considered to be more sedentary than other bird guilds (Blondel, 2000), but within most families of the land bird category, birds in continental ecosystems undergo impressive seasonal migrations between their arctic and temperate breeding grounds and tropical overwintering sites.

A total of 24 land bird species are protected under EPA regulation in the Maldives (Table 28). Of these, three species are breeding in the Maldives, while the other 21 species migrate seasonally or infrequently from their continental breeding grounds to the Maldives for overwintering.

Five land bird species are widely occurring throughout the Maldives. One land bird species occurs only in the southern atolls, one species has been introduced by humans, while for the other 17 species the occurrence is not resolved. Anderson and Shimal (2020) list one species as common in the Maldives, seven species as uncommon, ten species as rarely occurring, three species only occurring as vagrants in the Maldives, and for three species the occurrence has not been resolved.

Table 28: Land bird species in the Maldives. Status in the Maldives based on Anderson and Shimal (2020). Green cells indicate where birds met the shortlisting criteria, and detailed species-level assessment data was obtained by interviews. Based on a short-listing by breeding status, distribution, and occurrence within the Maldives, a detailed assessment of two land bird species in the Maldives was conducted through the interview process. LC = Least Concern, NT = Near Threatened.

English name	Dhivehi name	IUCN status	Breeding status	Distribution status	Occurrence status
Asian Koel	Koveli	LC	Yes	Widespread	Common
Black-winged Kite	Fiyakalhu baazu	LC	Yes	South	Rare
House Sparrow	Kurulla dhooni	LC	Yes	Introduced	Uncommon
Common Swift	Forikey	LC	No	Widespread	Uncommon
Western House-martin	Ramathi forikey	LC	No	Widespread	Uncommon

English name	Dhivehi name	IUCN status	Breeding status	Distribution status	Occurrence status
Barn Swallow	Gsamathi forikey	LC	No	Widespread	Uncommon
Amur Falcon	Amur surumuthi	LC	No	Widespread	Uncommon
Western Marsh Harrier	Ehanda	LC	No	?	Uncommon
Eurasian Kestrel	Surumuthi	LC	No	?	Uncommon
Pallid Harrier	Hudhu ehanda	NT	No	?	Rare
Montagu's Harrier	Valu ehanda	LC	No	?	Rare
Osprey	Keyolhu baazu	LC	No	?	Rare
Little Swift	Forikey	LC	No	?	Rare
Lesser Kestrel	Rai surumuthi	LC	No	?	Rare
Eurasian Hobby	Surumuthi	LC	No	?	Rare
Red-Throated pipit	Mushi fenfoa dhooni	LC	No	?	Rare
Grey Wagtail	Alhi fenfoa dhooni	LC	No	?	Rare
Western Yellow Wagtail	Reendhoo fenfoa dhooni	LC	No	?	Rare
Pallid Swift	Forikey	LC	No	?	Vagrant
European Bee-eater	Ihosfani dhooni	LC	No	?	Vagrant
Tree Pipit	Dhon fenfoa dhooni	LC	No	?	Vagrant
Oriental Honey-buzzard	—	LC	No	?	?
Common Buzzard	—	LC	No	?	?
Pale Martin	—	LC	No	?	?

6.5.2. Ecological background

6.5.2.1. General breeding and non-breeding habitats of land birds

Tropical land bird species breed in diverse habitats ranging from dense rainforests and mangroves to open woodlands and scrublands (White & Kiff, 2000). These habitats provide shelter, food, and safety for raising their young. Many songbirds build nests in trees or shrubs (Shirihai & Svensson, 2018). Cuckoos lay their eggs in the nests of other birds, leaving the host species to raise their chicks (Payne, 2005). Diurnal birds-of-prey, like hawks, falcons, and eagles, nest in tall trees or cliffs, preferring areas with good visibility for hunting (Ferguson-Lees & Christie, 2001).

During the non-breeding season, birds may move within their habitats to find food or avoid competition (Greenberg, 1986). Some species are sedentary, remaining in their territories year-round, while others are locally nomadic, shifting to areas with better resources during dry periods (Shirihai & Svensson, 2018).

Palearctic migratory land birds travel vast distances to overwinter in the Indian subcontinent's warm and resource-rich environments (Shirihai & Svensson, 2018). Species like wagtails, pipits, and swifts arrive in the tropics during the Northern hemisphere winter after breeding in northern regions (Shirihai & Svensson, 2018). They occupy diverse non-breeding habitats, including forests, wetlands, grasslands, and even urban areas, depending on their dietary needs. Raptors like buzzards and kestrels are commonly seen soaring over open fields or perched in wooded areas during this time (Ferguson-Lees & Christie, 2001).

6.5.2.2. General migration patterns and timing of land birds

Many tropical land birds are sedentary and stay in their territories year-round, as stable climates provide consistent food and shelter (Stutchbury & Morton, 2022). However, some species may move short distances within their habitat, especially during dry seasons, to access water or better food resources (Stutchbury & Morton, 2022). These movements are less predictable and often linked to local environmental conditions (Stutchbury & Morton, 2022).

In contrast, migratory species exhibit well-defined long-distance migration patterns. Many of these birds, such as wagtails, pipits, and swifts, breed in temperate and boreal regions of Europe and Asia during the Northern hemisphere summer (Stutchbury & Morton, 2022). As winter approaches, they travel thousands of kilometres to reach the Indian subcontinent, where the warmer climate and abundant food resources support them during the non-breeding season. This southward migration typically begins in late August to early September, with most birds arriving in the subcontinent between September and November (Stutchbury & Morton, 2022).

Diurnal birds-of-prey, like buzzards and harriers, also follow similar migration patterns, leaving their Northern hemisphere summer breeding grounds as prey becomes scarce in colder months (Ferguson-Lees & Christie, 2001). These birds often use thermal columns and ridges to glide long distances efficiently, timing their journeys to coincide with favourable weather conditions (Ferguson-Lees & Christie, 2001).

Palearctic migrants generally start their return journey to their breeding grounds in February to April, as spring brings abundant resources in northern regions (Stutchbury & Morton, 2022). The synchronized timing of their migration allows them to exploit seasonal food availability and optimal breeding conditions (Stutchbury & Morton, 2022).

6.5.2.3. General diet of land birds

The diet of land bird varies based on their ecological role, habitat, and season. Tropical species and Palearctic migratory species that overwinter in the Indian subcontinent have adapted to diverse food sources (Stutchbury & Morton, 2022).

Tropical land birds are highly specialized or generalist feeders, depending on their niche. Many species, feed on fruits, nectar, and insects (Payne, 2005; Stutchbury & Morton, 2022). These birds often play a key role in seed dispersal within their habitats. Other species, like bee-eaters, are insectivores, catching flying insects in mid-air (Stutchbury & Morton, 2022). Raptors like hawks and eagles primarily hunt small mammals, birds, reptiles, or large insects, depending on their size, hunting capabilities, and food availability (Ferguson-Lees & Christie, 2001).

Palearctic migratory birds, which overwinter in the subcontinent, exhibit flexible diets to adapt to the tropical environment (Stutchbury & Morton, 2022). Insectivorous species, such as wagtails and swifts, actively forage for insects and spiders in forests, wetlands, and scrublands (Stutchbury & Morton, 2022). Pipits feed on a mix of insects and small fruits, taking advantage of the abundant tropical vegetation (Stutchbury & Morton, 2022). Larger migratory raptors, such as buzzards and harriers, hunt lizards, and smaller birds during their stay (Ferguson-Lees & Christie, 2001).

The diverse diet of these birds highlights their ecological importance. Insects kept in check by insectivores prevent pest outbreaks, while frugivorous birds aid in seed dispersal.

6.5.2.4. General monitoring methods for land birds

Bird surveys are a common technique where observers systematically record birds in specific areas. Point counts and transect walks are widely used, with observers noting bird species seen or heard over fixed distances or time periods (Bibby, 2000). This method helps estimate population sizes and species diversity. For migratory species, these surveys are often conducted at stopover sites or wintering grounds to track seasonal abundance (Bibby, 2000).

Mist netting is another important tool. Birds are captured in fine nets, allowing researchers to collect data on their size, weight, age, and health (Poulin *et al*., 2000; Ralph *et al*., 2004). They are often ringed with metal or colour rings before release, enabling long-term tracking of individual birds when recaptured (Stamm *et al*., 1960). Ringing data provide critical insights into migration routes and stopover durations when re-sighted or re-captured (Horton *et al*., 2023).

Tracking devices, such as GPS and geolocators, are increasingly used to track the movements of land birds. These devices record location data, helping to map

migration routes and identify important habitats (Bridge *et al*., 2013; Iverson *et al*., 2024). Smaller migratory birds, like warblers, are often studied using lightweight radio transmitters (Raybuck *et al*., 2020).

Citizen science plays a significant role in monitoring, with birdwatchers contributing valuable data through platforms like eBird (Stuber *et al*., 2022). These observations help researchers identify population trends and shifts in migration timing (Stuber *et al*., 2022).

6.5.2.5. General threats for land birds

Habitat loss is a significant challenge. Deforestation, agricultural expansion, and urban development destroy or fragment forests, wetlands, and grasslands (Schmiegelow & Mönkkönen, 2002). This reduces breeding sites, shelter, and food sources. Migratory birds face additional risks as they rely on a network of habitats along their migration routes and in their wintering grounds (Yong *et al*., 2021). Destruction of wetlands and other stopover habitats leaves them with fewer resting and feeding areas (Kirby *et al*., 2008).

Climate change further exacerbates these threats. Rising temperatures, shifting rainfall patterns, and extreme weather events disrupt habitats and food availability (Şekercioğlu *et al*., 2012). For migratory birds, changes in climate can alter the timing of migration, leading to mismatches between their arrival and the availability of resources (Bitterlin & Van Buskirk, 2014; Miller-Rushing *et al*., 2008).

Hunting and trapping also pose significant risks, particularly for migratory species. In some regions, birds are captured for food, the pet trade, or traditional practices (McCulloch *et al*., 1992; Yong *et al*., 2021). Raptors like hawks and eagles are sometimes targeted due to conflicts with humans or livestock (Restrepo-Cardona *et al*., 2020).

Pollution is another major issue. Pesticides used in agriculture reduce insect populations, depriving insectivorous birds of food (Barton *et al*., 2023). Toxic chemicals can poison birds (Barton *et al*., 2023). Light pollution, especially in urban areas, disrupts nocturnal migration, causing birds to become disoriented (Cabrera-Cruz *et al*., 2018).

Invasive species, such as rats and cats, threaten birds by preying on their eggs and chicks (Harper & Bunbury, 2015).

6.5.3. Asian Koel (Koveli; *Eudynamys scolopaceus*)

IUCN status: Least Concern

Global population estimate: UNKNOWN
Global population trend: STABLE

Table 29: Distribution of Asian Koel (Koveli; *Eudynamys scolopaceus*) in the Maldives. Status: b = breeding; b? = breeding suspected; nb = non-breeding; - = absent/vagrant. If breeding is occurring, no information on non-breeding status is provided.

Area	Natural atoll	Administrative atoll	Status
North	Ihavandhippolhu	HA.	b
	Thiladunmathi	HA. + HDh.	b
	Makunudhoo	HDh.	b
	Miladhunmadulu	Sh. + N.	b
	North Maalhosmadulu	R.	b
	South Maalhosmadulu	B.	b
	Goifulhafehendhu	B.	b
	Faadhippolhu	Lh.	b
Central	Thoddu	AA.	b
	Ari	AA. + ADh.	b
	South Male	K.	b
	Felidhoo	V.	b
	North Nilandhoo	F.	b
	South Nilandhoo	Dh.	b
	Mulaku	M.	b
	Kolhumadulu	Th.	b
	Haddhunmathi	L.	b
South	Huvadhoo	GA. + GDh.	b
	Fuvahmulah	Gn.	b
	Addu	S.	b

6.5.3.1. Situation in the Maldives

The Asian Koel (*Eudynamys scolopaceus*) is a widespread and common breeding bird throughout the Maldives (Figure 52). It is a brood parasite that lays its eggs in the nests of the House Crow (Kaalhu; *Corvus splendens*). Some interviewees noted that the Asian Koel is becoming less common due to the removal of forest areas and trees on the local islands, where they would usually forage. On some local islands where all trees had been cut, the Asian Koel has already disappeared entirely. However, in the southern atolls of Fuvahmulah and Addu, the Asian Koel is rapidly increasing since the establishment and spread of House Crows.

Phillips (1964) reported the Asian Koel as widespread and breeding throughout the Maldives. Ash and Shafeeg (1994) reported the Asian Koel as resident and widespread in moderate numbers throughout the archipelago, exclusively parasitising the House Crow.

6.5.3.2. Atoll-level summary

Northern Maldives
Ihavandhippolhu: widespread breeding.
Thiladunmathi: widespread breeding.
Makunudhoo: breeding, but formerly more abundant.
Miladhunmadulu: widespread breeding.
North Maalhosmadulu: widespread breeding.
South Maalhosmadulu: widespread breeding.
Goifulhafehendhu: widespread breeding.
Faadhippolhu: widespread breeding.

Central Maldives
Thoddu: breeding, but formerly more abundant.
Ari: widespread breeding.
South Male: widespread breeding.
Felidhoo: widespread breeding.
North Nilandhoo: widespread breeding.
South Nilandhoo: widespread breeding, but formerly more abundant.
Mulaku: widespread breeding.
Kolhumadulu: widespread breeding.
Haddhunmathi: widespread breeding.

Southern Maldives
Huvadhoo: widespread breeding, on some islands formerly more abundant.
Fuvahmulah: widespread breeding, becoming more abundant.
Addu: breeding, but only recently arrived when house crows established on the atoll.

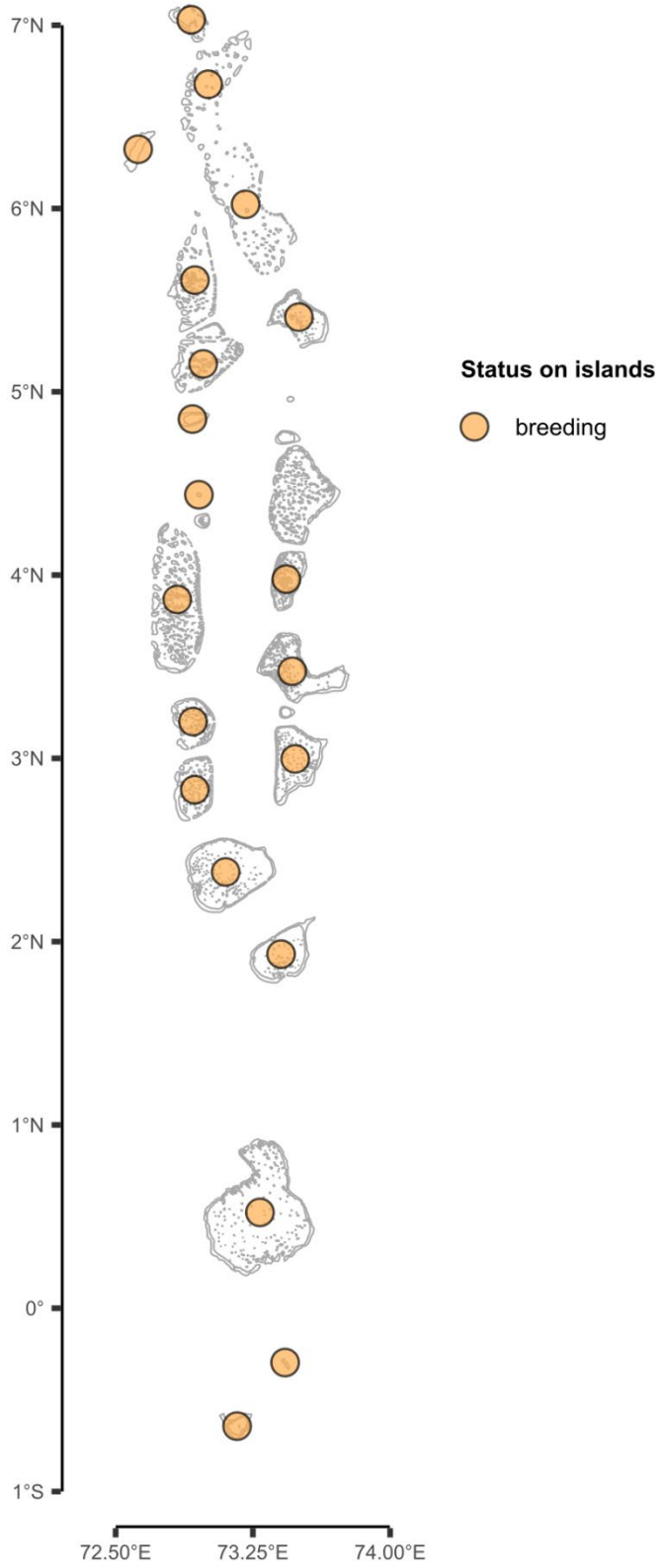


Figure 52: Distribution of Asian Koel (Koveli; *Eudynamys scolopaceus*) in the Maldives. When breeding is occurring on an atoll, no information on roosting is provided. If only roosting is indicated, it means that no breeding is known to occur in the atoll.

6.5.3.3. Indian Ocean distribution

Breeding distribution:

Across the Indian subcontinent, China, mainland southeast Asia, Philippines, Indomalayan region, Lakshadweep, Maldives, Andaman and Nicobar Islands (Limparungpatthanakij, 2024) (Figure 53).

Non-breeding distribution: Generally considered resident but some populations migratory, especially those in the northern part of its distribution range (Limparungpatthanakij, 2024).

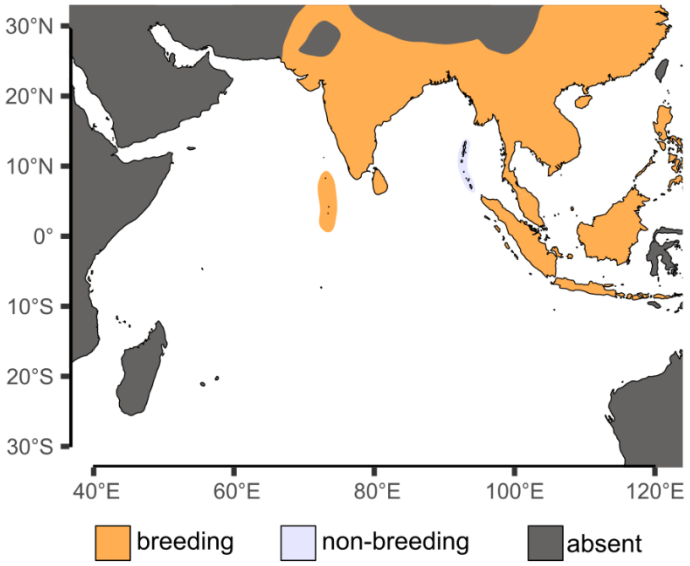


Figure 53: Indian Ocean-wide distribution map of Asian Koel (Koveli; *Eudynamys scolopaceus*).

6.5.3.4. Breeding biology

Average clutch	Incubation	Fledge	Nest	Diet
1–3 eggs	13–17 d	19–28 d	Brood parasite	Mainly fruits

Timing: In Pakistan: breeding June to July (Limparungpatthanakij, 2024). In India: breeding March to October but peaking May to July (Limparungpatthanakij, 2024). Sri Lanka: breeding April to August (Limparungpatthanakij, 2024). On Thai-Malay peninsula: breeding April to July (Limparungpatthanakij, 2024). Singapore: breeding April to October (Limparungpatthanakij, 2024). Generally considered to be more seasonal in northern parts of distribution range (Limparungpatthanakij, 2024).

Nest site: Brood parasite. Resident in secondary forest, mangroves, broadleaf forest, coastal scrub, plantations, and city parks (Limparungpatthanakij, 2024).

Clutch size: Usually lays more than one egg in a host's nest, up to three eggs per parasitised nest (Limparungpatthanakij, 2024). A single host's nest often consists of eggs laid by more than one female (Abdulali, 1931).

Incubation period: 13–17 days in House Crow nests (shorter compared with 16–20 days incubation period for House Crow itself) (Limparungpatthanakij, 2024).

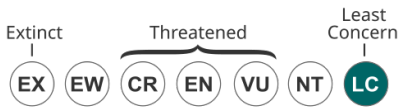
Fledging: The nestling period is 19–28 days, and the fledged young is fed for another 2–3 weeks before departure from foster parents (Limparungpatthanakij, 2024).

Breeding success: Hatching success and fledging survival rates 1.7 and 1.2, respectively, per brood (Ali *et al*., 2007).

Breeding cycle and interval: Information not available/known.

6.5.4. Black-winged Kite (Fiyakalhu baazu; *Elanus caeruleus*)

IUCN status: Least Concern



Global population estimate: UNKNOWN
Global population trend: STABLE

Table 30: Distribution of Black-winged Kite (Fiyakalhu baazu; *Elanus caeruleus*) in the Maldives. Status: b = breeding; b? = breeding suspected; nb = non-breeding; - = absent/vagrant, ? = uncertain. If breeding is occurring, no information on non-breeding status is provided.

Area	Natural atoll	Administrative atoll	Status
North	Ihavandhippolhu	HA.	?
	Thiladunmathi	HA. + HDh.	nb
	Makunudhoo	HDh.	nb
	Miladhunmadulu	Sh. + N.	nb
	North Maalhosmadulu	R.	nb
	South Maalhosmadulu	B.	-
	Goifulhafehendhu	B.	-
	Faadhippolhu	Lh.	nb
Central	Thoddu	AA.	-
	Ari	AA. + ADh.	-
	South Male	K.	-
	Felidhoo	V.	-
	North Nilandhoo	F.	-
	South Nilandhoo	Dh.	-
	Mulaku	M.	-
	Kolhumadulu	Th.	-
	Haddhunmathi	L.	-
South	Huvadhoo	GA. + GDh.	b
	Fuvahmulah	Gn.	b
	Addu	S.	b

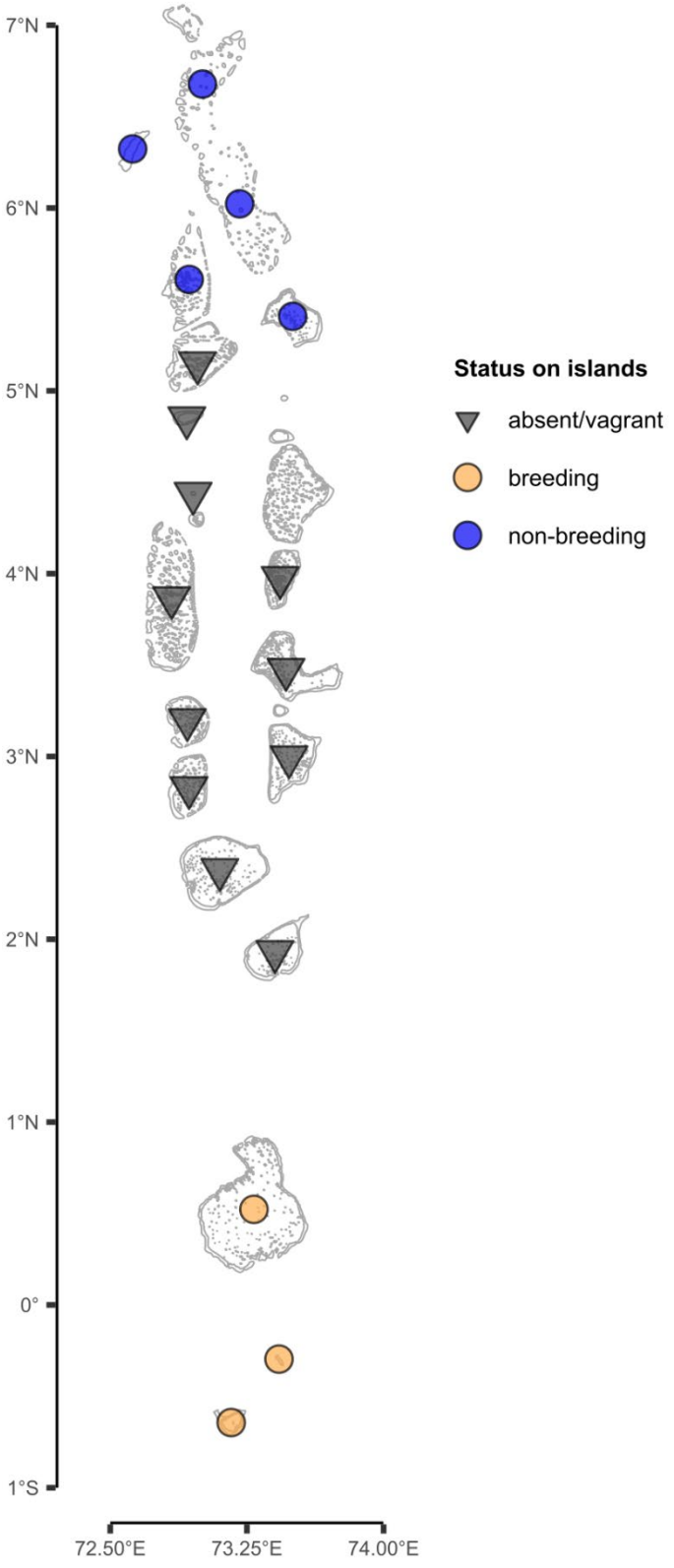
6.5.4.1. Situation in the Maldives

The Black-winged Kite is known as a visitor to the northern Maldivian atolls (Figure 54), where its arrival and presence is usually linked to the northeast monsoon season (Iruvai). One interviewee linked the arrival of Black-winged Kite to the Hey nakaiy (18 to 31 October) and stated that birds would then usually stay for 2–3 months. The birds are then mostly observed hovering around the islands, and sometimes also perching on large Banyan trees (Nika gas; *Ficus prolixa*). One interview partner from Makunudhoo atoll stated that House Crows aggressively chase away Black-winged Kites from the islands. In the central Maldivian atolls, Black-winged Kites are only infrequently and rarely observed, with one interviewee stating 1–2 birds appearing every few years. An alternative Dhivehi name used for Black-winged Kite in several interviews was ‘Surumuthi’, which is the same name used for different species of kestrels, hobbies, and the Amur Falcon (*Falco amurensis*) – all considered uncommon to rare vagrant migratory species in the Maldives (Anderson & Shimal, 2020).

In the southern Maldivian atolls of Fuvahmulah and Addu, Black-winged Kites are known to nest albeit only in very low numbers. On Fuvahmulah, it nests on coconut palms and is often seen above the Fuvahmulah Nature Park wetland areas, as well as the farmlands. On Addu atoll, about seven breeding pairs are known, incl. in the Addu Nature Park area. The breeding population on Addu is considered highly vulnerable, as Black-winged Kite are a sought-after and valuable bird for poachers and a single chick can be sold for over 15,000 MVR (ca. US$ 970). Eggs are also being poached and then incubated.

6.5.4.2. Atoll-level summary

Northern Maldives
Ihavandhippolhu: status uncertain.
Thiladunmathi: occasionally observed in low numbers (up to 10 birds) during northeast monsoon season.
Makunudhoo: occasionally observed in low numbers (1–2 birds) during northeast monsoon season.
Miladhunmadulu: occasionally observed in low numbers (1–2 birds) during northeast monsoon season.
North Maalhosmadulu: occasionally observed in low numbers (1–2 birds) during northeast monsoon season.
South Maalhosmadulu: not observed.
Goifulhafehendhu: not observed.
Faadhippolhu: occasionally observed in low numbers (1–2 birds) during northeast monsoon season.



Central Maldives
Thoddu: not observed.
Ari: rarely observed in low numbers (1–3 birds) during northeast monsoon season.
South Male: not observed.
Felidhoo: not observed.
North Nilandhoo: infrequently observed in low numbers (1–2 birds) every few years in F. Bilehdhoo.
South Nilandhoo: not observed.
Mulaku: rarely observed during northeast monsoon season.
Kolhumadulu: not observed.
Haddhunmathi: not observed.

Southern Maldives
Huvadhoo: observed in low numbers (2–4 birds) during northeast monsoon season. Breeding on GDh. Keraminthaa.
Fuvahmulah: breeding in small numbers, estimated 1–2 birds.
Addu: breeding Addu Nature Park, on S. Bedhey Aurah, estimated seven breeding pairs. Also observed on S. Hithadhoo near waste management centre, RAF area, and Maa Kilhi, as well as S. Meedhoo.

Figure 54: Distribution of Black-winged Kite (Fiyakalhu baazu; *Elanus caeruleus*) in the Maldives. When breeding is occurring on an atoll, no information on roosting is provided. If only roosting is indicated, it means that no breeding is known to occur in the atoll.

6.5.4.3. Indian Ocean Distribution

Breeding distribution:

Breeds in Pakistan, Indian subcontinent, Southern China, Malay Peninsula, possibly also into Iraq, Iran, and Eastern Arabian Peninsula (Kemp *et al*., 2020). Recorded breeding in Lakshadweep (Ali & Ripley, 1987), potentially more common there in the past as non-breeding resident (Hume, 1876). Also widespread in Africa (Kemp *et al*., 2020) (Figure 55).

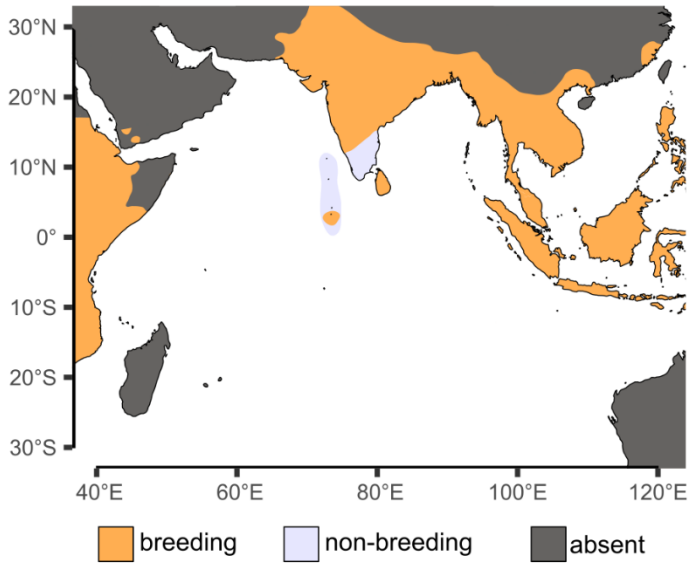


Figure 55: Indian Ocean-wide distribution map of Black-winged Kite (Fiyakalhu baazu; *Elanus caeruleus*).

Non-breeding distribution:

Wide-ranging, usually nomadic outside breeding season. Known to travel large distances in search for conditions supporting abundant prey. Records of birds at sea in Gulf of Aden and on Farasan Islands, Red Sea, suggest movement between African and Arabia (Kemp *et al*., 2020).

6.5.4.4. Breeding biology

Average clutch	Incubation	Fledge	Nest	Diet
3–4 eggs	30–35 d	30–40 d	Trees, palms	Rodents, small birds, reptiles, insects

Timing: In Malaysia: breeding March to April (Kemp *et al*., 2020). Borneo: breeding September to December (Mann, 2008; Zainal Abidin *et al*., 2014). Sumatra: breeding April to August (Kemp *et al*., 2020). Arabian Peninsula: breeding August to October (Jennings, 2010). Ethiopia: breeding April to October (Ash & Atkins, 2009). India: year-round with local variations in peak breeding activity, probably largely driven by food availability (Ramli & Fauzi, 2018).

Nest site: Breeding habitat is open savannah grasslands with scattered bushes and small trees; extends into arid steppe, desert or clearings in dense woodlands, wherever prey is abundant (Kemp *et al*., 2020). Nest a saucer-shaped platform, 25–45 cm wide, built from sticks, weeds, lined with dry grass, and generally in a fork of upper branches of trees or palms (Kemp *et al*., 2020). Nest usually 3–12 m above ground (Ferguson-Lees & Christie, 2001). Nests sometimes reused for successive clutches, but more commonly pair uses new nest every season (Tarboton, 2001).

Clutch size: 3–4 eggs per clutch, laid at a one- to three-day interval (Tarboton, 2001; Harrison & Castell, 2002).

Incubation period: 30–35 days (Ferguson-Lees & Christie, 2001).

Fledging: 30–40 days after hatching, but young may remain dependent on adult feeding for an additional 20–60 days (Ferguson-Lees & Christie, 2001).

Breeding success: Total reproductive success rate (eggs to fledging) 28–51%, with experienced birds achieving significantly higher success rates (up to 60%) (Duchateau & Delage, 2006).

Breeding cycle and interval: Information not available/known.

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Appendix 1: Shortlisted species

A spreadsheet containing English and Dhivehi names of the 29 bird species shortlisted for the interview process.

Appendix 2: Standardised interview guide

The standardised interview spreadsheet guide used for each interview, containing a short info section to gather demographic data on interviewee, as well as a standard format to record presence, occurrence, within-atoll distribution, abundance estimate, breeding status, and any other anecdotal information for each of the target bird species.

Appendix 3: Atoll species datasheet

The results data table containing the summarised atoll-level distribution data for each species (columns) in each atoll (rows). Abbreviations correspond to those used in main text, i.e. b = breeding, nb = breeding, 0 = absent, + = 1-10 birds, ++ = 11-100 birds, +++ = 101 – 1000 birds, and ++++ = >1,000 birds, ? = status uncertain.

Appendix 4: Island level datasheet

List of all islands (rows) that were identified by interview partners as being either a breeding (b) or roosting (nb) island for a given species (columns).

Appendix 5: Validation results

Data table summarising the validation score of each species (columns) and for each atoll (rows). Values range from 0 (strong disagreement) to 5 (strong agreement).

Ocean Country Partnership Programme

The Ocean Country Partnership Programme (OCPP) is a bilateral technical assistance and capacity building programme that provides tailored support to countries to manage the marine environment more sustainably, including by strengthening marine science expertise, developing science-based policy and management tools and creating educational resources for coastal communities. The OCPP delivers work under three thematic areas: biodiversity, marine pollution, and sustainable seafood. Funding is provided through the overarching Blue Planet Fund (BPF) by the UK Department for the Environment, Food and Rural Affairs (Defra).