

To save the only freshwater lake in a migratory mega hotspot in CAF from poaching and encroachment

Final Project Report



Project Location: Korakulam Tank, Mannar Island, Sri Lanka

Project report by

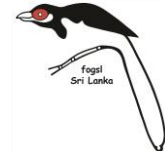
Ms. Gayomini Panagoda

Avian Sciences & Conservation | Field Ornithology Group of Sri Lanka,
Department of Zoology and Environment Sciences, University of Colombo

Submitted on 2023/05/10



**Oriental
BIRD CLUB**



Executive Summary

'Korakulam' is the only freshwater lake that is found on Mannar island of north-western Sri Lanka. This crucial wetland, for overwintering migrants of the Central Asian Flyway, is threatened by encroachment & poaching. We aimed to actively intervene to prevent poaching & further encroachment in Korakulam, largely through awareness raising, community engagement & value addition.

The project consisted of three components: quantifying (1) the status of poaching in the site, (2) its year-round usage by waterbirds & (3) value addition to the site by promoting eco-tourism & awareness raising. The project was conducted from December 2022-January 2023.

We interviewed 45 community members using questionnaires, to evaluate poaching & egg raiding in the site. Thirty-one percent of them mentioned that poaching occurs currently while 22% stated that egg raiding is taking place. Poaching is conducted as a source of food (72%), a source of income (56%) & a source of recreation (44%). Poaching largely (70%) happens during the migratory season, & ducks, pelicans & francolins are the main targets. Nevertheless, it was understood that poaching has largely been reduced due to increased settlements & presence of armed forces in the area.

A temporal comparison of satellite images showed that clearing of the scrubland habitat along the tank reservation began within the last decade & gradually increased. By 2017, ~80% of scrubland was removed (despite the site being declared a Nature Reserve in 2016), after which the pace of constructing settlements within reservation was accelerated.

We recorded 108 species of birds, including 17 red-listed waterbird species, during monthly surveys. The highest number of waterbird species (49) & monthly maximum waterbird count (8448 individuals) were recorded in March. Northern Pintail, Garganey & Lesser Sand Plover were among the most abundant species. The charismatic Greater Flamingo used the site from March-May (300-800 individuals). Breeding of eight waterbird species was observed including the newly described Hanuman Plover & nationally Vulnerable Little Tern.

We launched a series of awareness programs called 'Guardians of birds-Mannar', under which six programs were conducted incorporating ~260 participants including school children, youth groups & wildlife officers. In collaboration with the Department of Wildlife Conservation, Department of Agrarian Development, Mannar District Secretariat & local NGOs, we secured a 40 perch land amidst the encroached belt of tank reservation & created a 'Green Corridor'. There, we constructed a bird observational blind, erected information billboards & restored the lost scrubland habitat. We established the 'Mannar Bird Club' (MBC) with a vision to further promote the conservation & appreciation of birds & their habitats within the local community. Upon the project completion, the Green Corridor was opened as a public facility & is now being used by the birders, wildlife photographers & tourists. It is maintained by MBC.

Project team

Ms. Gayomini Panagoda	Project team leader PhD researcher and activist Avian Sciences & Conservation Field Ornithology Group of Sri Lanka Department of Zoology & Environment Science, University of Colombo
Prof. Sampath Seneviratne	Main advisor to the project Professor in Zoology Avian Sciences & Conservation Field Ornithology Group of Sri Lanka Department of Zoology & Environment Science, University of Colombo
Ms. Rebecca Miranda	Project partner President Association for Women Empowerment, Sri Lanka
Mr. Jude Janith	A graduate researcher University of Colombo
Rev. Maryathas Lyon	Chief Priest Christ the King Church, Mannar
Mr. Edison Marynathan	Former Wildlife Ranger, DWC & Environmental activist Mannar
Mr. Indika Jayatissa	General Manager The Palmyrah House - a local hotel in Mannar
Mr. Lahiru Walpita	Aqua-culturist, Officer-in-charge, Sea Cucumber Breeding Centre, Mannar

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1.0 Introduction

1.1 Mannar Island; a critical site in Central Asian Flyway

Sri Lanka represents one of the southernmost land masses of the Central Asian Flyway (CAF) that spans across Eurasia to southern Asia. The Mannar Island of north-western Sri Lanka is considered an entry point of migrant birds to Sri Lanka. Being bordered to the Palk Bay & Gulf of Mannar, it holds large extents of prime waterbird habitats such as lagoons, marshes, estuaries, mangroves, sea shore, islets in the sea, sand and mud flats, and salterns, making it one of the four richest waterbird regions in Sri Lanka (Wijesundara et al., 2017). These habitats provide critically important non-breeding grounds for migrants of CAF. About 400,000 to one million waterbirds of 122 species (20 of them are globally red listed) have been recorded annually in Mannar. It also provides breeding habitat for eight species of seabirds, many of which are listed as Critically Endangered (CR) in the national Red List of threatened species. Accordingly, the Mannar Island can be considered as a critical site in CAF (Panagoda et al., 2021).

1.2 Korakulam tank & its importance for birds

‘Korakulam’ is the only freshwater lake that is found on Mannar island. It is a shallow, man-made, seasonal tank which holds water from September – March. Adjacent to the tank, there are paddy fields and scrub forest. The Korakulam wetland is ~2 km² in area. It comes under the protection of two government departments: Department of Wildlife Conservation (DWC), as it is a part of the the Vidataltivu Nature Reserve, & Department of Agrarian Development (DAD), as the tank water is used for irrigating the adjacent paddyfields.

Korakulam & the adjacent wetlands support ~85 waterbird species including 09 globally threatened and 15 nationally threatened (06 are CR) species. Out of this, 45 species use this site for over-wintering, including globally threatened Great Knot (EN), Red Knot (NT), Black-tailed Godwit (NT), Bar-tailed Godwit (NT), Curlew Sandpiper (NT), Eurasian Curlew (NT) and Great Thick-knee (NT). Further, there was a recent sighting (2018) of Spoon-billed Sandpiper (CR) in an adjoined wetland to Korakulam. Korakulam is also a Wetlands International’s Asian Waterbird Census site and is adjoined to the saltwater lagoon system - Vankalei Sanctuary – a Ramsar wetland.

During the migratory season, about 25,000 of waterbirds have been seen at a time in Korakulam including some scarce and charismatic migrants (eg: Greater Flamingo, Black-tailed Godwit, Pallas’s Gull and migratory ducks) making it a popular birding destination. During the dry season, it becomes a critical breeding ground of Hanuman Plover (newly proposed species), Great thick-knee, Spot-billed Duck (nationally CR), Little tern (nationally Vu), etc. In addition to the bird life, endangered mammals such as Fishing Cat (EN) and Grey Slender Loris (nationally NT) also occupy this area. It is also frequented by an introduced population of wild horses and Asiatic wild ass.



Figure 1a: Location of Korakulam wetland in Mannar Island of northwestern Sri Lanka. The white dashed line shows the Medawachchiya - Taleimannar highway.

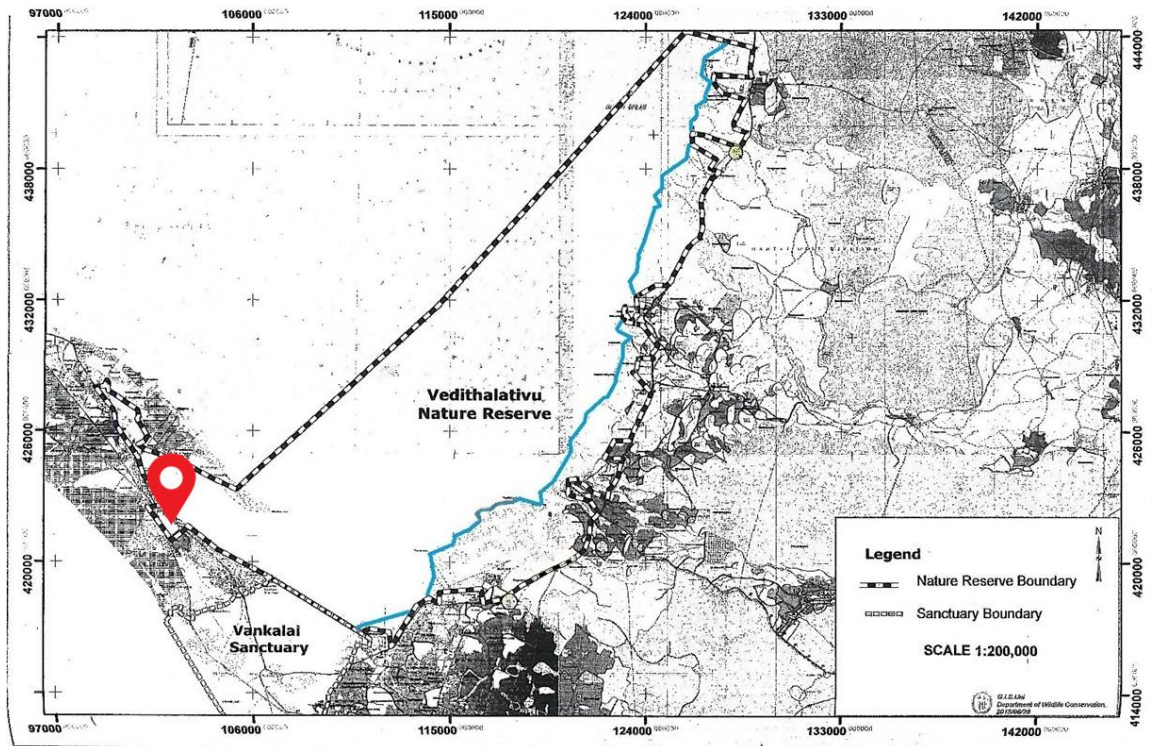


Figure 1b: Location of Korakulam wetland within Vidathalativu Nature Reserve (Source: FFPO (No. 1956/13, 2016))



Figure 2: Korakulam tank, during the rainy season

1.3 Threats to Korakulam wetland; encroachment & poaching

Situated 3km away from Mannar town, the land surrounding Korakulam is among the most populated areas of the island. As it is adjacent to the main highway and railway, many new settlements are coming up (including housing schemes) around Korakulam. Even though Korakulam falls within the jurisdictions of a protected area (Vidataltivu Nature Reserve) on paper, the increasingly high demand for land surrounding the tank, have caused illegal encroachment followed by non-reversible changes to this critical wetland habitat.

Most of the acacia scrubland, a unique eco-system that is inhabited by migratory passerines, which surrounded the lake in early days are now cleared which was important to prevent pollutants and silt seeping into the waterbody. Further, the encroachers are illegally fencing into the lake, some even putting up permanent constructions. About 25% of the wetland area has already been encroached by illegal settlers with the assistance of public and private parties. These illegal constructions and increased human activity have threatened the wintering shorebirds and ducks that aggregate here in thousands. Apart from being a disturbance to the birds, it is aesthetically killing a once famous birdwatching hotspot.

It was further observed that the local community is engaged in poaching of wintering waterbirds and egg raiding causing destruction of nests. The real extent of poaching and egg raiding is not known.

The bird life is also disturbed by stray dogs which frequent the lake area. The growing human activity has also led to garbage dumping to this critical eco-system.



Figure 3: Illegal encroachment in Korakulam



Figure 4: An incident of poaching observed in Korakulam, November 2018

2.0 Objectives

Main Objective

- To actively intervene to prevent poaching & further encroachment in Korakulam, largely through awareness raising, community engagement & value addition

Specific Objectives

1. To quantify the nature and extent of poaching & egg raiding in Korakulam and to take active intervention to stop poaching
2. To study the year-round usage of the site by waterbirds and to use that information to lobby for practical conservation action
3. Value addition to the site by promoting eco-tourism through creating bird hides, information cut-outs etc.
4. To raise awareness of the local community & other stakeholders through awareness programs & engage them in conservation action by establishing a local bird club

3.0 Methods

3.1 Quantifying the nature and extent of poaching & egg raiding in Korakulam

The local community & other stakeholders were interviewed via a questionnaire survey, in December 2021 & March 2022, in order to evaluate the nature and extent of poaching of waterfowl and egg raiding in the site & also their awareness and perception towards protection of the site.

The questionnaire had seven sections. Section 1 obtained the demographic information of the respondent. Section 2-4 asked for the status & trends of poaching & egg raiding, the target species & involved parties. Section 5 & 6 assessed the deterioration & encroachment of the site, as section 7 assessed the awareness of the importance of the site, perception towards poaching & protection of the site. The questionnaire comprised of both close-ended (majority) & open-ended questions. When multiple choices were given, the respondents could select more than one response. See appendix for the questionnaire.

The survey results were tabulated and subsequently analyzed & visualized using Microsoft Excel 2019.



Figure 5: The research team administering the questionnaire

3.2 Studying the year-round usage of the site by waterbirds

Monthly waterbird surveys were conducted in the site, on average covering 6.6 hours per month (average 2.3 days per month), from December 2021-November 2022 (two months (April & October) were missed due to logistical constraints). Using line transects, point & block counts, we recorded bird species encountered and their abundance throughout the year & nest availability and density during the breeding season. For the identification, counting & other observations of birds, a Nikon Prostaff

spotting scope (20-60x), binoculars (Zeiss 10X42, Opticron 8X42 & Nikon 8X42) & a zoom camera were used.

Using these data, the year-round fluctuation of waterbird species richness and abundance was assessed, with special reference to globally and nationally threatened species.



Figure 6: The researchers collecting data in the field

3.3 Awareness raising, community engagement & value addition to the site

We initiated a series of awareness programs targeting the local community, school children & youth groups especially, aiming to educate them on the importance of Mannar for migratory birds, the critical bird habitats therein & the threats that the birds face. We further wanted to inspire them to observe, value & study the birdlife around them. A local bird club was established to further promote the conservation & appreciation of birds & their habitats within the local community.

Through an action plan that was proposed to Mannar District Secretariat to promote Eco-tourism in the area, we created a 'Green Corridor' in the site, constructing a birdwatching blind, erecting information billboards & restoring the scrubland habitat. More details regarding these activities are given under section 4.

4.0 Results

4.1 The nature and extent of poaching & egg raiding in Korakulam, & awareness and perception of the local community towards poaching and protection of the site

4.1.1 Demographics of the interviewees

We interviewed 45 community members & stakeholders, out of which 84% were residents within 2 km of Korakulam. They represented the villages, Tharapuram East (27 respondents) & Eluthur (11), that together encircled the protected area. The remaining 16% were from the neighboring villages & town (within 25 km of Korakulam) who regularly visit or pass by Korakulam.

Sixty-eight percent of the respondents were between 26-65 years old (age categories: 26-35 (24%), 36-50 (24%), 51-65 (20%)). Eleven percent were >65 years old. Majority of the respondents were male (71%). The respondents represented three ethnic groups; majority were Muslims (55%) while the rest constituted of Tamils (40%) & Sinhalese (5%). Twenty-two percent of the respondents were engaged in jobs in government or public service while 19% were occupied with small business/ retail. Seventeen percent were manual laborers, 10% were engaged in fishing or livestock rearing & another 17% were involved in other jobs. The remaining 15% were either unemployed or still studying. Seventy-one percent of the households interviewed had a family of four to six individuals. Twenty-nine percent of the respondents had a duration of residence of 1-5 years, in the area. Another 29% had been living there for 5-19 years, 16% for 20-39 years, & 13% for >40 years. Only 9% had a period of residence <1 year. Seventy-two percent of the interviewees from the households along the main road has settled here during the last five years. Figure 7 summarizes the demographics of the respondents.

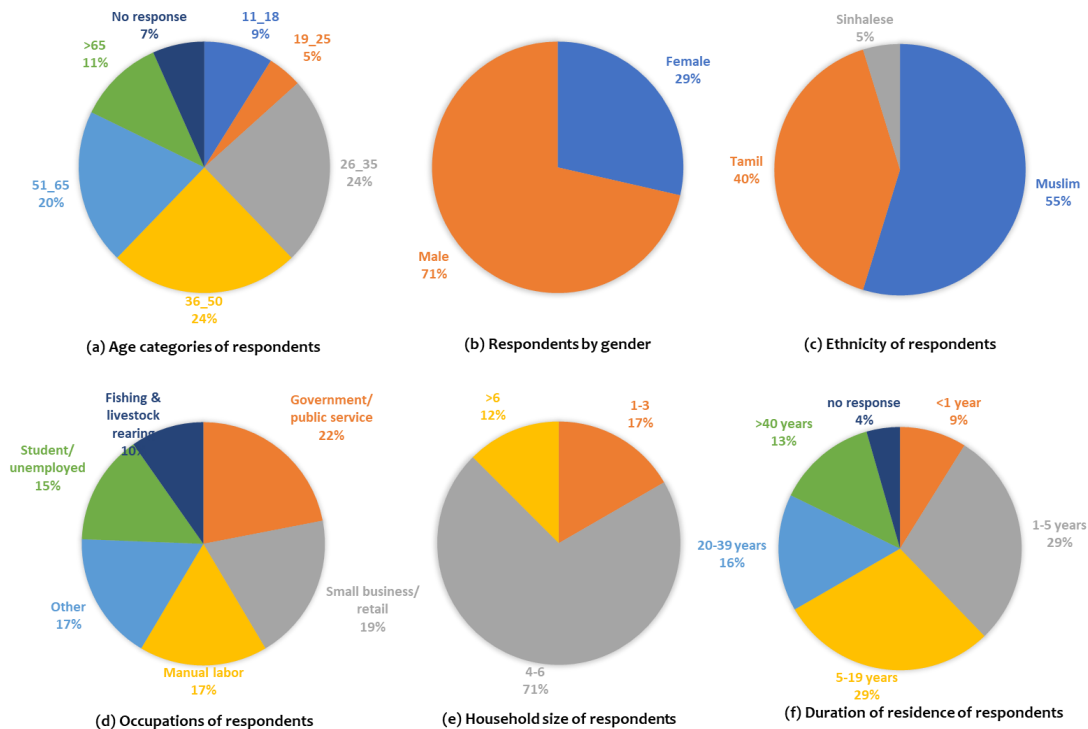


Figure 7: Demographics of the respondents

4.1.2 Nature of poaching & egg raiding

Fifty-one percent of the respondents stated that either poaching occurs currently (31%) or has happened before (20%). Forty-two percent said that poaching is not happening in the area while the remaining 7% had no idea. Regarding egg raiding, 29% stated that either egg raiding occurs currently (22%) or has happened before (7%). While 40% affirmed that there is no egg raiding in the area, 13% had no idea about it (Figure 8).

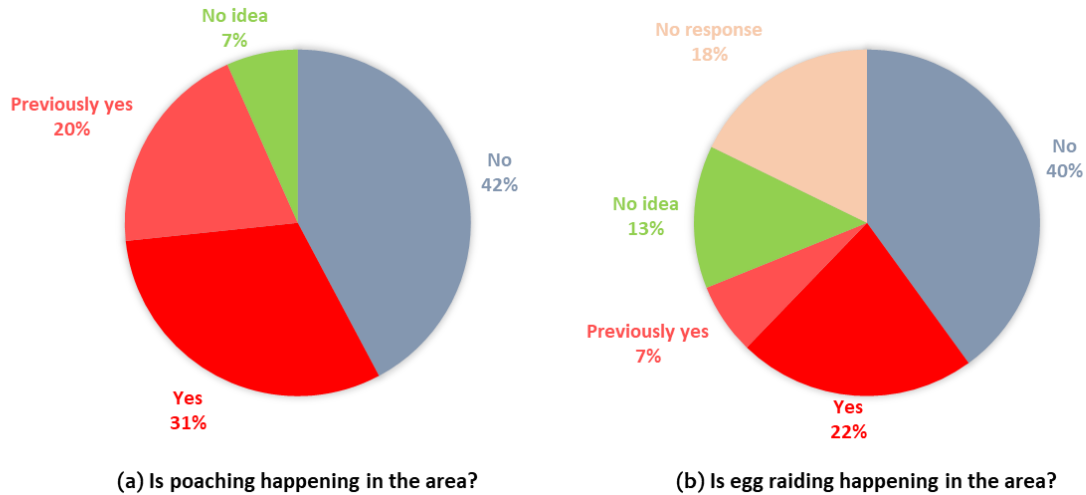


Figure 8: Occurrence of poaching & egg raiding in the site

The next set of questions were administered to the respondents who stated that poaching is/was present (n=23).

When asked for the purpose of poaching, 72% out of the respondents who stated that poaching is/was present, identified poaching provides a source of food. Fifty-six percent said that it is a source of income while 44% mentioned that as a recreational activity (Respondents were allowed to choose more than one answer).

When asked for the season of poaching, 70% of those respondents stated that poaching happens in the rainy season which aligns with the peak of migratory season (December-March). The others (30%) said that poaching happens throughout the year.

When asked for the frequency of poaching, 44% of those respondents mentioned that poaching happens daily-weekly. Twenty-two percent said that it happens occasionally-rarely while the rest (22%) had no idea.

Regarding the poaching method, 58% of respondents said that nooses, traps & nets are used for capturing the birds & other animals. Thirty-three percent mentioned the use of catapult, another 33% mentioned shooting, 25% mentioned poisoning & 8% mentioned other methods.

All the interviewed respondents had access to alternative protein sources consisting of fish, poultry & other meat.

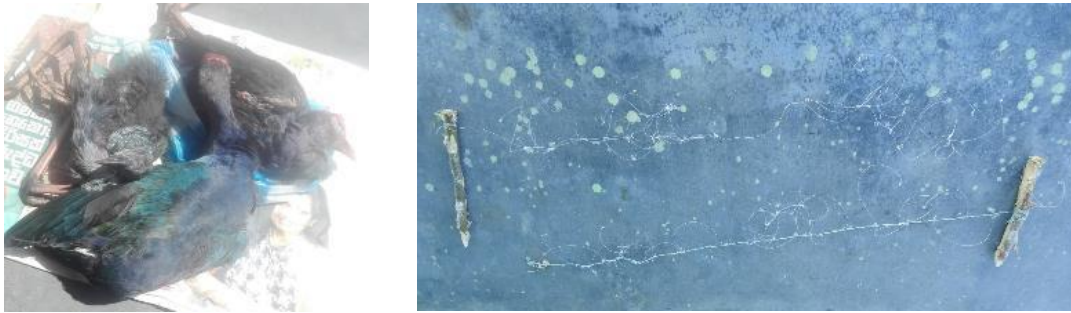


Figure 9: A noose line that is used to catch waterbirds (image courtesy: DWC Vankalei range office)

4.1.2.1 Target species

While 81% of respondents (n=17) stated that birds are the target of poachers, 19% said that it is the mammals. Forty-eight percent mentioned that both birds & mammals are being hunted. Out of the respondents who identified birds as a target (n=17), 92% mentioned that waterbirds are the target. Ducks followed by pelicans were found to be the main victims. Fifty-four percent mentioned that the land birds are being targeted: Francolins/ quails were found to be preferred. The questionnaire further revealed that the eggs of terns & other ground breeding birds are being collected at the site.

The respondents who said that the mammals are being targeted (67%, n=14), identified Black-naped hare (58%), Spotted deer (42%), Wild boar (25%) & other animals (25%) as the targets.

When asked for the reason of poaching, 82% said that it is the taste of meat, 27% identified the nutritional or medicinal value/cultural beliefs as the reason while 9% said that they are easy to catch.

4.1.2.2 Involved parties

Seventy-five percent of the respondents stated that poaching occurs as a group activity whereas 38% said that it is an individual activity. When asked for the age group of poachers, 38% stated that there is no specific age class for the poachers while the rest of respondents (63%) identified youngsters <18 years (60%) or adults (>18 years; 40%) as the main age group of the poachers.

Sixty percent of the respondents mentioned that the bushmeat are not being sold (poachers hunt for their own consumption). On the contrary, the rest of the respondents (40%) said that bushmeat selling occurs. Further, 69% indicated that there are buyers to supply. Seventy-five percent of the respondents revealed that the villagers themselves engage in poaching (no hunters come from outside).

4.1.3 Deterioration of the site

Forty-two percent of the respondents agreed that the wildlife is less abundant now compared to the past while 27% disagreed. When asked about the quality of the water, majority of the respondents (33%) mentioned that there is no change in water quality whereas 27% said that the water quality is deteriorating. They pointed out that increasing settlements around the tank & poor management of garbage/ effluents are affecting the quality of the water. Regarding the deforestation of the surrounding area, 58% said that the scrubland around the lake has been reduced over the years while 13% disagreed. The majority of the respondents (49%) had no idea whether the breeding activities of the birds have reduced over the years; 18% said that it is reduced while only 4% stated that there is no such reduction.

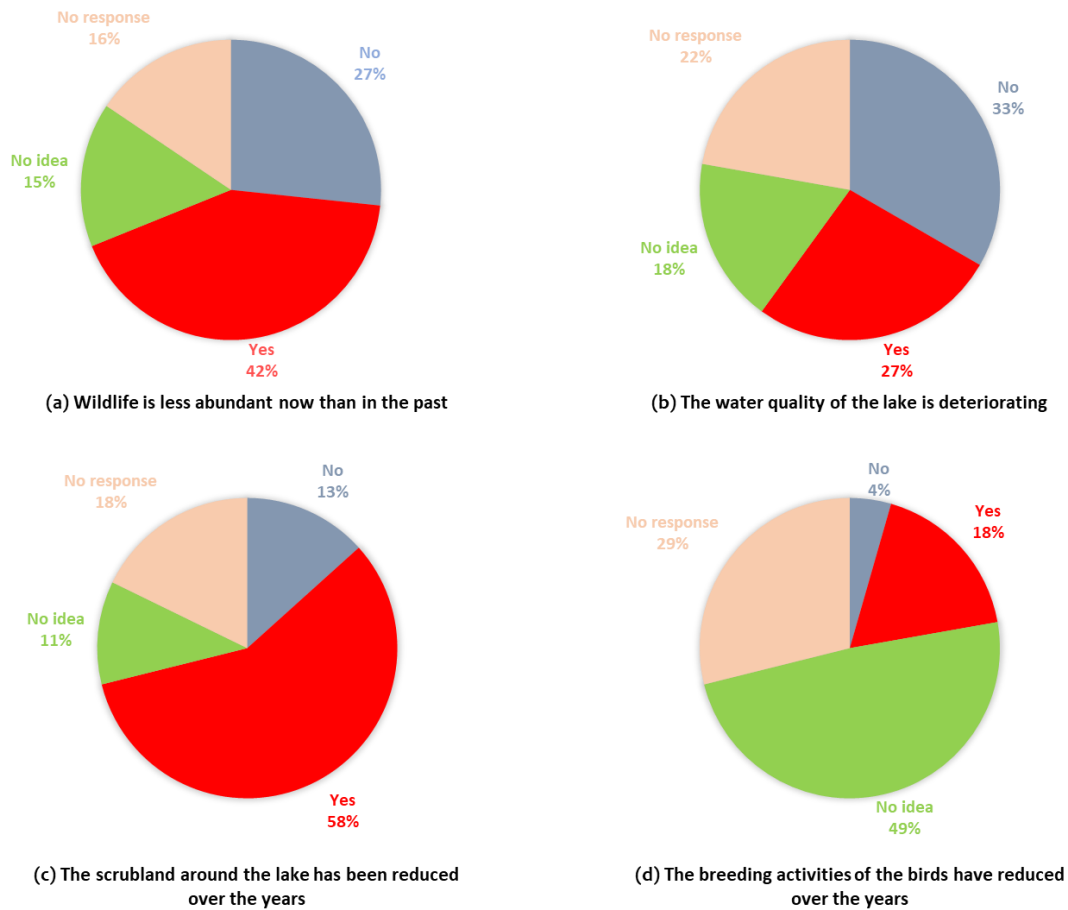


Figure 10: Deterioration of the site over the years, as perceived by the respondents

4.1.4 Encroachment

Majority of the respondents (75%) said that the lands around Korakulam are private while 49% identified the government as an owner. Seventy-one percent of the respondents were aware about the encroachment in the area while 15% said that there is no encroachment. Another 15% had no idea regarding that.

The major cause behind encroachment, as identified by the respondents (91%), is residence expansion; 23% identified paddy farming, 9% identified livestock rearing & fishing, 5% mentioned that it is for satisfying daily needs.

Seventy-seven percent of the respondents indicated that the residents of surrounding villages themselves are responsible for encroachment. Only 9% thought that the outsiders are encroaching the lands around Korakulam.

4.1.5 Awareness of the local community on the importance of the site

Majority of the respondents (56%) was not aware that the site is protected. Only 38% said that it is protected, out of whom some knew it as a reservation of the Department of Agrarian Development while the others knew it as a protected area by the Department of Wildlife Conservation. Nevertheless, most of the respondents (51%) were aware of the importance of the tank as a source of water. They identified that the tank provides water for paddy farming/ cultivation, livestock, daily activities (specially before the pipe water was provided) & allows fishing. Some even pointed out that the tank water is important for wildlife. All the respondents who claimed that tank water is not important (31%), used pipe water. Majority of the respondents knew that the site provides habitats for breeding birds (51%) & migratory birds (62%). They were aware that more birds arrive during the rainy season which aligns with the migratory season & mentioned of visiting 'Siberian ducks'.

Based on the answers given to section 7a of the questionnaire, the awareness levels of the respondents were ranked as very high, high, moderate, low & very low. Forty-one percent had high to very high awareness while 37% of interviewees had low to very low awareness. It was observed that 67% of the respondents whose awareness were high-very high have been living in the area >5 years.

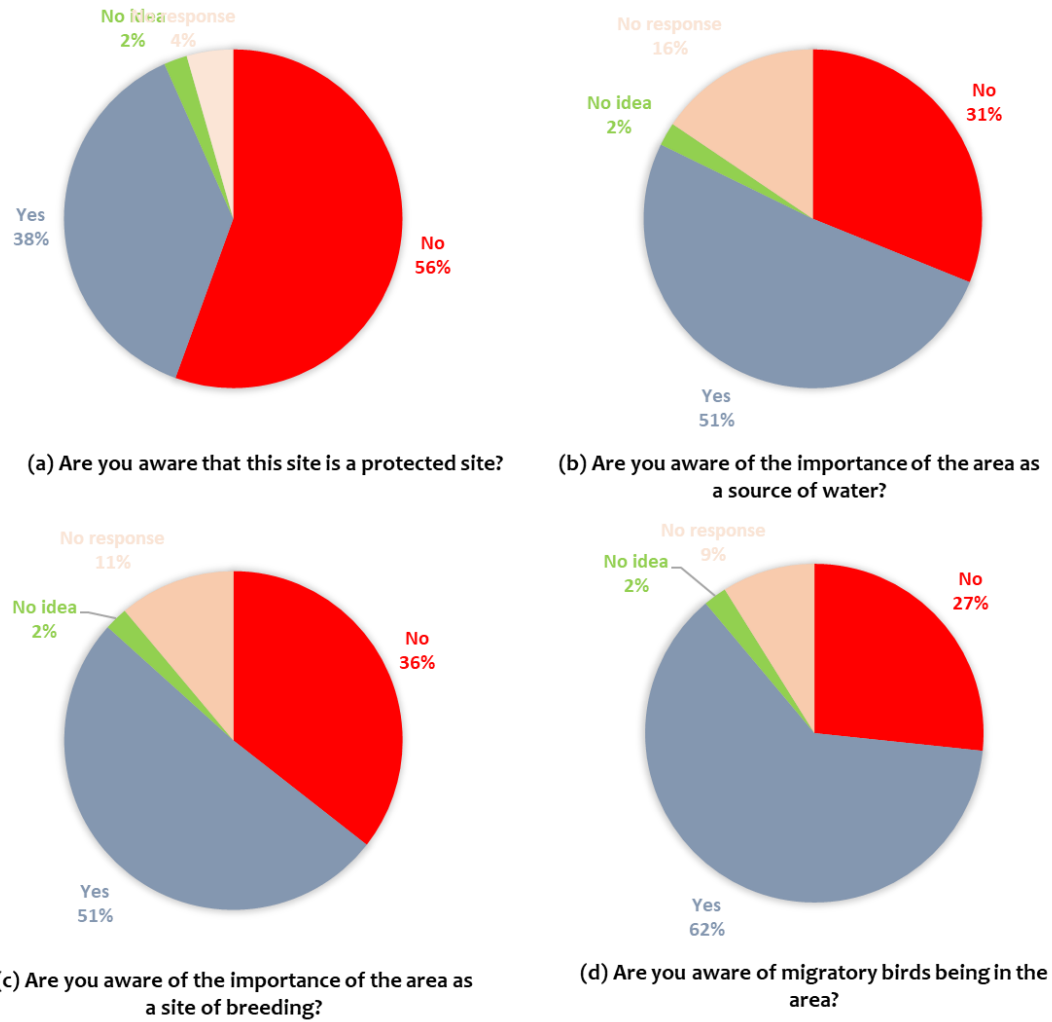


Figure 11: Awareness of the local community on the importance of the site

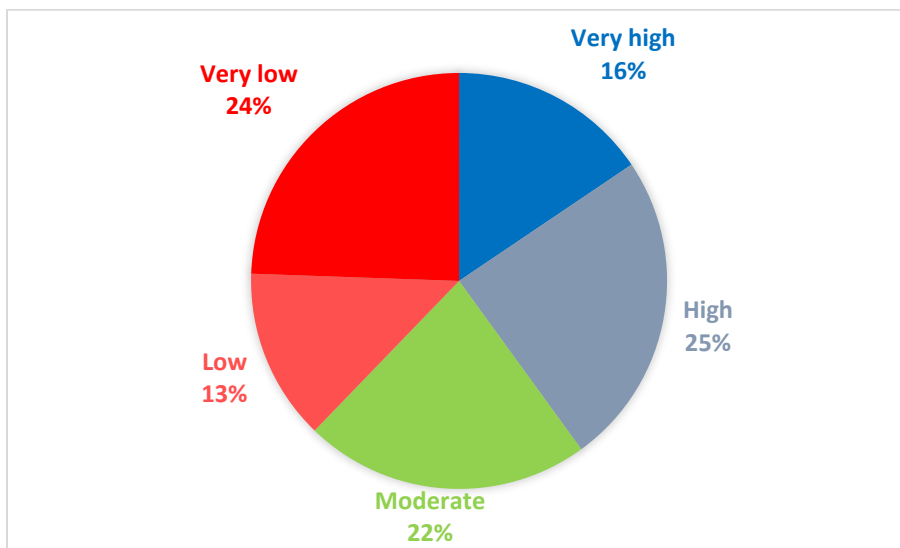


Figure 12: Level of awareness of respondents

4.1.6 Perception of the local community towards protection of the site

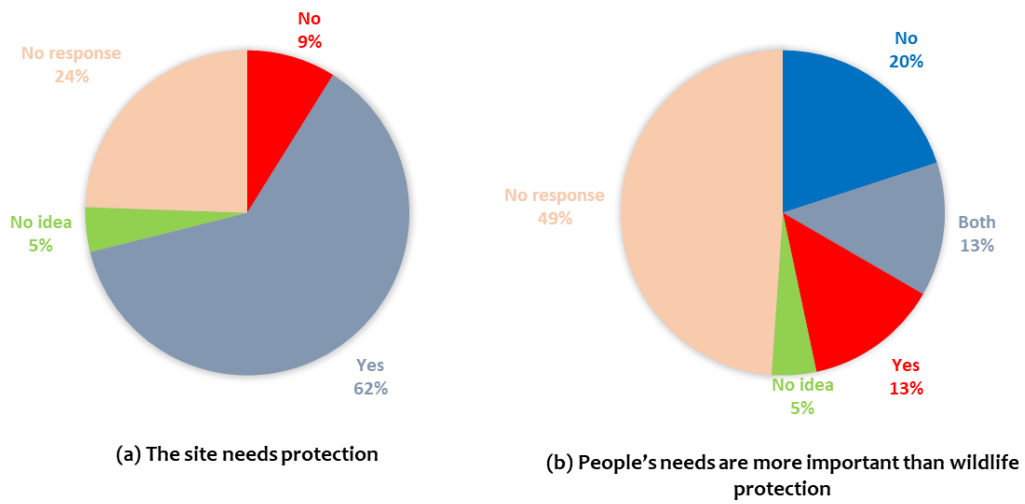


Figure 13: Perception of the respondents towards the protection of the site

Sixty-two percent agreed that the site needs protection & only 13% said that the people's needs are more important than wildlife protection. Twenty percent said that the wildlife should be given a priority while another 13% said that balancing both are important.

4.2 Studying the year-round usage of the site by waterbirds

A total of 35,166 individuals of birds which belonged to 108 species were counted during the waterbird surveys (Figure 14). This includes 69 resident species, 32 migrant species & seven more species with both resident & migrant populations in the country. Among them, there were 61 waterbird species out of which 07 were globally threatened & 10 nationally threatened. Table 1 lists the details on these threatened taxa. See the annexure for a complete checklist.

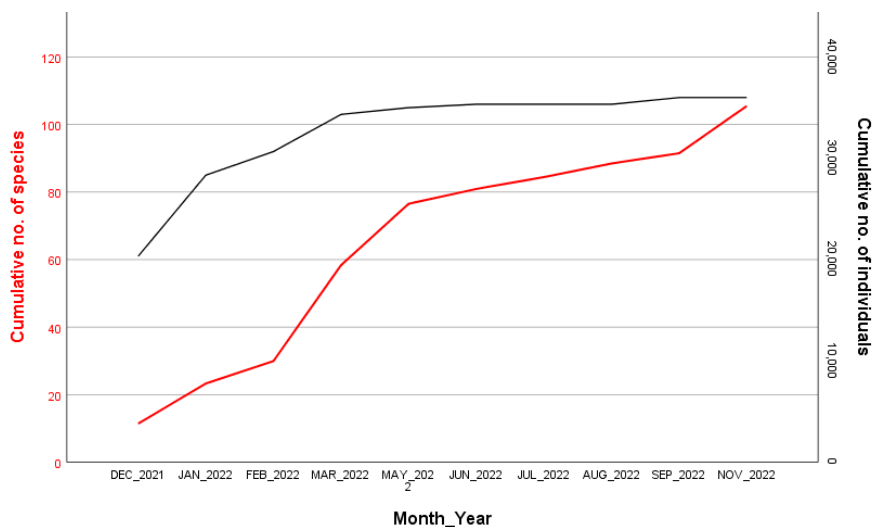


Figure 14: Cumulative number of species & individuals observed, across the survey period

Table 1: List of globally & nationally threatened waterbird species recorded during the surveys

Order	Species	National Conservation Status	Global Conservation Status
ANSERIFORMES	Cotton Pygmy-goose	NT	LC
ANSERIFORMES	Indian Spot-billed Duck	CR	LC
CICONIIFORMES	Painted Stork	LC	NT
PELECANIFORMES	Yellow Bittern	NT	LC
PELECANIFORMES	Black-headed Ibis	LC	NT
PELECANIFORMES	Spot-billed Pelican	LC	NT
SULIFORMES	Oriental Darter	LC	NT
CHARADRIIFORMES	Black-tailed Godwit	-	NT
CHARADRIIFORMES	Curlew Sandpiper	-	NT
CHARADRIIFORMES	Eurasian Curlew	-	NT
CHARADRIIFORMES	Greater Painted-snipe	VU	LC
CHARADRIIFORMES	Kentish Plover	VU	LC

CHARADRIIFORMES	Little Ringed Plover	VU	LC
CHARADRIIFORMES	Little Tern	VU	LC
CHARADRIIFORMES	Common Tern	CR	LC
CHARADRIIFORMES	Common Gull-billed Tern	CR	LC
CHARADRIIFORMES	Caspian Tern	CR	LC

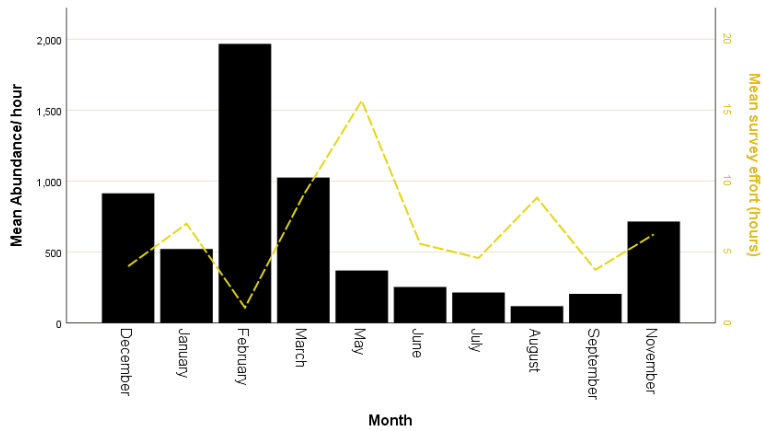


Figure 15a: Mean waterbird abundance per survey hour, across the year

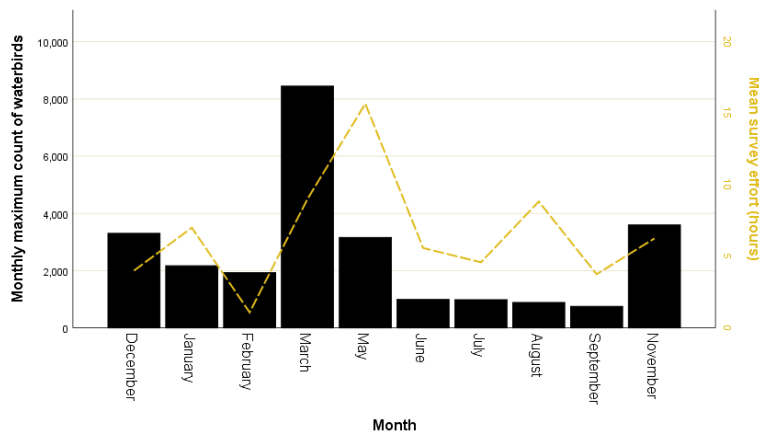


Figure 15b: Monthly maximum count of waterbirds, across the year

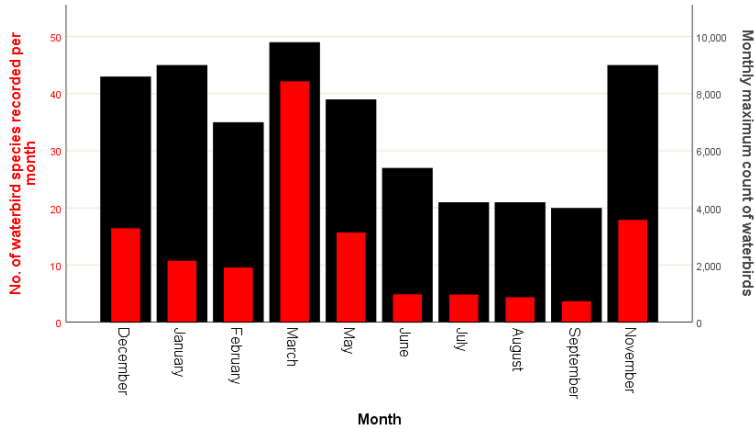


Figure 16: Fluctuation of waterbird species richness & abundance across the year

The parameters of mean waterbird abundance per survey hour, monthly maximum count of waterbirds & waterbird species richness varied greatly across the year.

The waterbird abundance & species richness remained generally high during the migratory months (November – March) while it was low within the non-migratory months (May - September). Both the highest monthly maximum waterbird count (8448 individuals) & highest waterbird species richness (49 species) were recorded in March, & they were lowest during September (752 individuals & 20 species respectively) (Figure 15-16).

The very low waterbird numbers reported during the non-migratory months partially correspond with the limited availability of water in the tank during that period, especially in August and September when the tank was almost completely dried up.

Northern Pintail (5973), Garganey (4947), Lesser Sand Plover (2652), Greater Flamingo (2650) & Black-winged Stilt (2245) were among the most abundant species who utilised the site. The total number of individuals counted during the survey period is shown in parentheses.

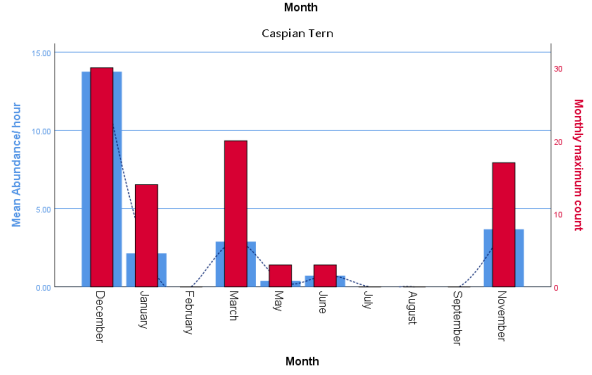
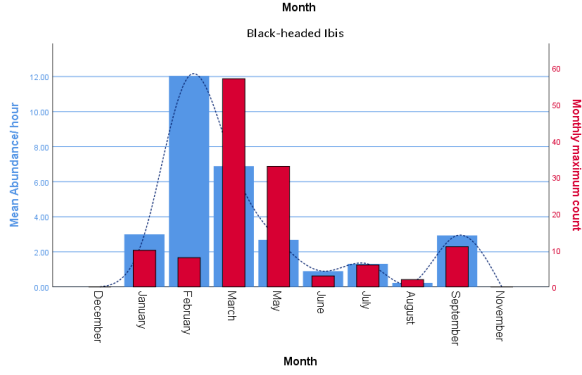
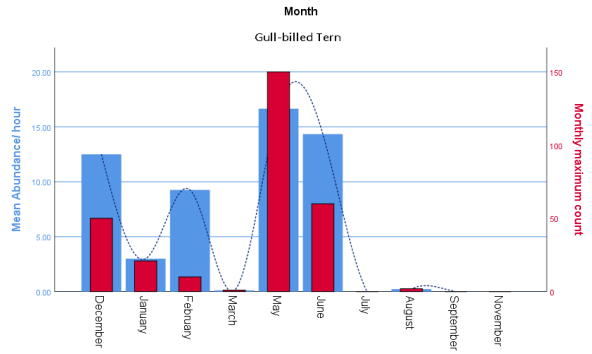
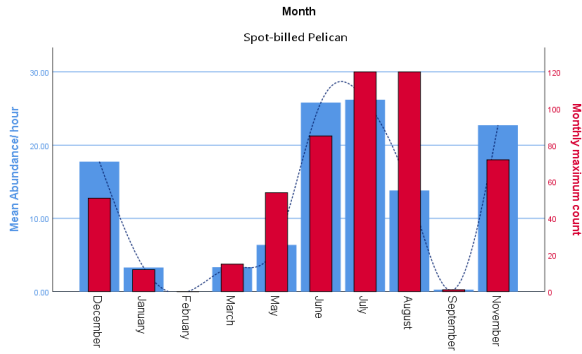
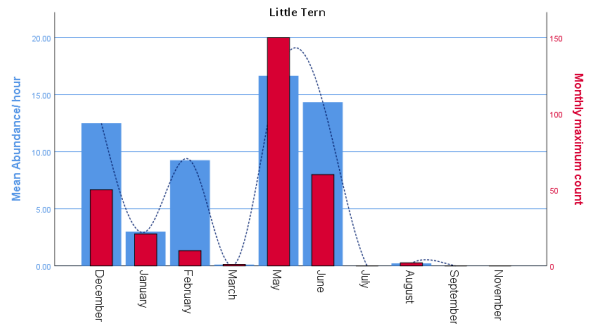
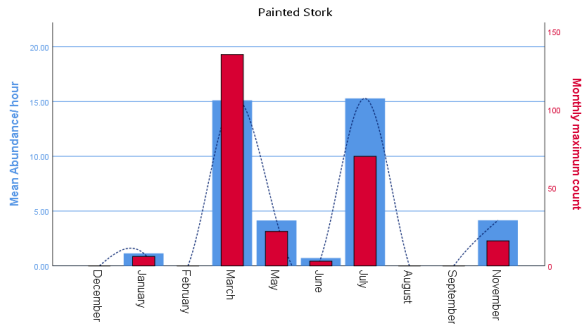


Figure 17a: Year-round usage of the site by threatened waterbirds

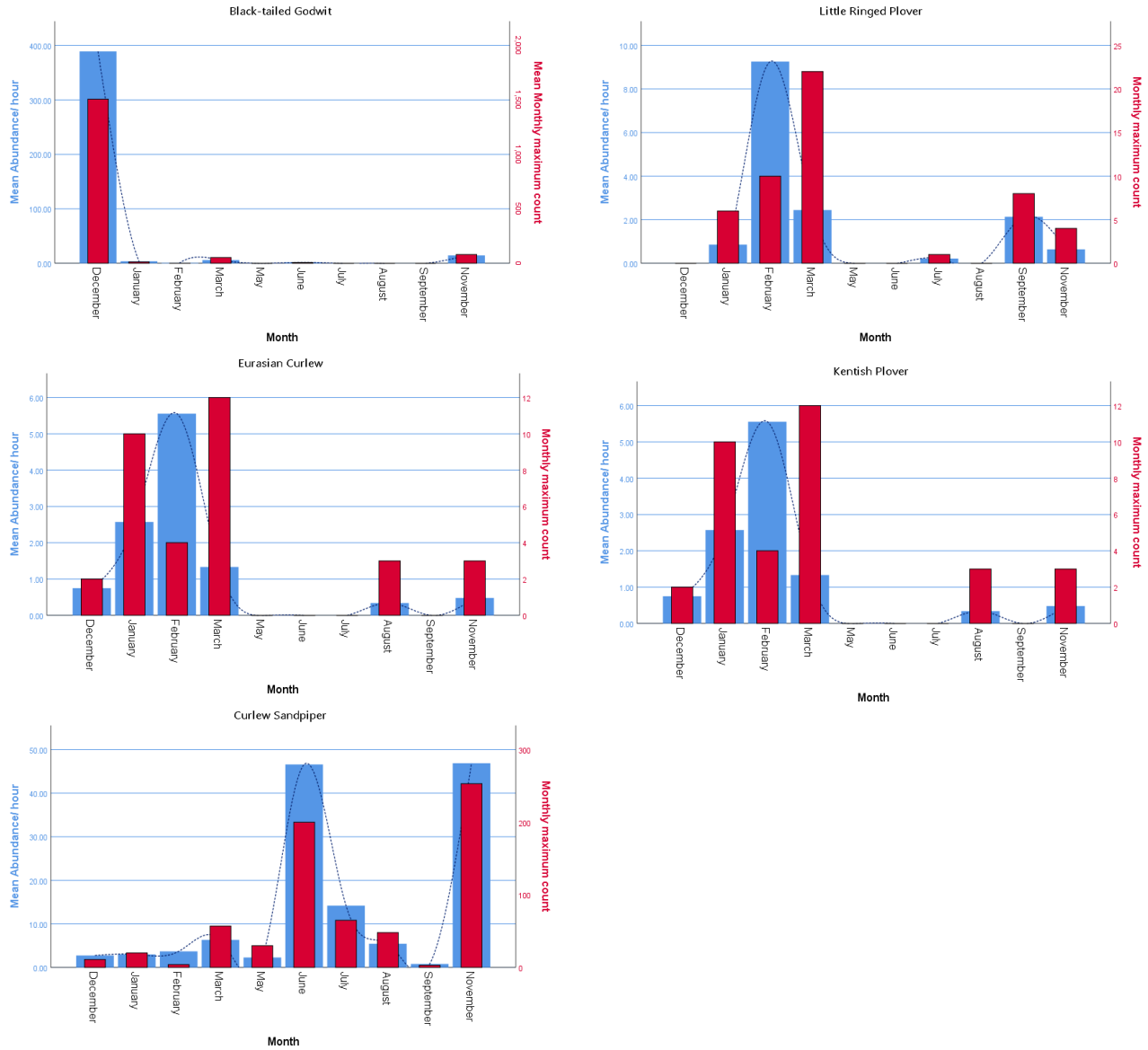


Figure 17b: Year-round usage of the site by threatened waterbirds

Figure 17 shows the year-round usage of the site by threatened waterbirds, as recorded during monthly surveys. Black-headed Ibis, Caspian Tern, Black-tailed Godwit, Eurasian Curlew, Little Ringed Plover & Kentish Plover were more abundant during the migratory season (November-April) while no such pattern was observed for the species as Painted Stork, Spot-billed Pelican, Gull-billed Tern & Curlew Sandpiper. Relatively high numbers of Little Tern were observed during the non-migratory/breeding season (May-June) when the species was found to be breeding in the site.

The threatened taxa of Indian Spot-billed Duck, Greater Painted Snipe, Cotton Pygmy Goose, Yellow Bittern, Common Tern & Oriental Darter were seen only during one or two months during the survey period. The charismatic Greater Flamingo was present in the site from March-May (300-800 individuals), towards the end of the migratory season.



Figure 18: The nationally CR Indian Spot-billed Duck in Korakulam, May 2022



Figure 19: Greater Flamingos in Korakulam, May 2022

4.2.1 Breeding waterbirds in Korakulam during the survey period

Breeding of eight waterbird species was recorded during the survey period. It includes Lesser Whistling Duck, Little Grebe, Common Moorhen, Eurasian Coot, Black-winged Stilt, newly described Hanuman Plover (*Charadrius seebohmi*), Red-wattled Lapwing & Little Tern. Out of these, Little Tern is nationally vulnerable due to its rarity in breeding colonies and the threats to its breeding habitats from dogs and people. The Hanuman Plover is a regional endemic who is restricted to Palk Bay & south-east arid zone in Sri Lanka while Eurasian Coot can be considered an uncommon breeding resident in the country.

We located nests of three species (Black-winged Stilt, Hanuman Plover & Little Tern) & recorded the number of eggs &/or chicks present. Eight Black-winged Stilt nests were found on May (2022-05-12 & 2022-05-16) having 3-4 eggs. Two nests had chicks including one with 2 eggs & 2 chicks while the other nest had only 1 chick. Five Hanuman Plover nests were found on May (2022-05-16) having 2-3 eggs. Two more possible nesting locations were reported in July & August (one each) where parents were observed with 1-2 chicks. Four Little Tern nests were found on May (2022-05-16) having 2-3 eggs. We mapped the nest locations & calculated nest densities in the site as follows; Hanuman Plover (17.24 nests/ km²), Black-winged Stilt (13.79 nests/ km²) & Little Tern (13.79 nests/ km²).

The other five species were observed as they were collecting nesting material/ making nests or they were seen with chicks who have not yet fledged.



Figure 20: A nest of Black-winged Stilt, with 2 chicks & 2 eggs, observed on 2022-05-16



Figure 21: A nest of Hanuman Plover, observed on 2022-05-16



Figure 22: A nest of Little Tern with 3 eggs, observed on 2022-05-16

4.3 Awareness raising, community engagement & value addition to the site

4.3.1 Value addition to the site through promoting eco-tourism

We proposed an Action Plan to Mannar District Secretariat, for **'Eco-Tourism promotion in Korakulm tank through a Birdwatching Blind and a Green Corridor'**. Site clearance for a 40 perch (0.1 ha) land area located along the northern boundary of the tank (amidst the encroached belt of tank reservation), facing the main road, was obtained from the Department of Wildlife Conservation & Department of Agrarian Development. Following the action plan, Initial site assessment & preparation were conducted in August 2022, with the inputs from DAD (Figure 23). We used this space to construct a birdwatching hide, erect information billboards & create a 'Green Corridor' restoring the lost scrubland habitat.



Figures 23: (a) The officials from DWC & DAD with the project team, after examining the site for clearance, (b) DAD officers securing the reservation boundary of the tank, (c) Initial site preparation, August 2022



Figure 24: Ceremonial foundation laying of the birdwatching blind with the participation of stakeholders, October 2022



Figure 25: Bird Blind after the completion, January 2023



Figure 26: Information billboards erected in the site



Figure 27: During replanting of the site, November 2022

Upon completion of the work, proposed under the action plan, we opened the site for public on 26th January 2023. The opening ceremony was conducted followed by a stakeholder meeting on the conservation of birds & promotion of eco-tourism in Mannar. Its aim was to bring all the key parties to a common forum where ASC and Field Ornithology Group of Sri Lanka (FOGSL) will share their insights to guide bird conservation in Mannar based on their research findings & discuss the prospects for conservation & community engagement.

Upon the project completion, the Green Corridor was opened as a public facility & is now being used by the birders, wildlife photographers & tourists.



Figure 28: During the opening ceremony of Korakulam Green Corridor



Figure 29: During a stakeholder meeting conducted in January 2023, on the conservation of birds & promotion of eco-tourism

4.3.2 Community engagement & awareness raising

We launched a series of awareness programs called ‘Guardians of birds-Mannar’, under which six programs were conducted incorporating ~260 participants including school children, youth groups & wildlife officers. Programs were conducted in February, March, May, July & September 2022.



Figure 30: School programs conducted under ‘Guardians of Birds – Mannar’



Figure 31: During a training program that was conducted for local range officers of Department of Wildlife Conservation

We established the ‘Mannar Bird Club’ (MBC) with a vision to further promote the conservation & appreciation of birds & their habitats within the local community. Its mission to educate members and the public about birds through meetings, field trips, and other events, and to actively participate in bird-related conservation efforts.

The Green Corridor is currently maintained by MBC.



Figure 32: Left – Logo of Mannar Bird Club, right - MBC receiving a collection of books from the Divisional Secretary, Mannar, during the inaugural meeting

5.0 Discussion

Our questionnaire survey confirmed that poaching of wild animals is prevalent in and around Korakulam. We found that villagers in the area themselves engage in poaching to varying degrees, either as a means of obtaining food, generating income, or for recreation. While both birds & mammals were hunted largely through nooses, traps & nets, waterbirds were found to be the prime target. According to the respondents, poaching mostly happens during the north-eastern monsoonal rains that fill the tank. This aligns with the peak migratory season in Sri Lanka (December-March) when large aggregations of migrant waterbirds occur in the site. The ducks (who are known as 'Siberian ducks' among the locals) & pelicans were found to be preferred targets by the poachers. The most abundant migrant ducks utilising the site include Northern Pintail, Eurasian Wigeon & Garganey. Though listed as Least Concern by IUCN red list, they still show a decreasing population trend globally. Further, the Spot-billed Pelican who frequents the site is globally Near Threatened. The collection of eggs of ground breeding birds also prevailed in the site, affecting the breeding success of species as nationally Vulnerable Little Tern & Hanuman Plover who is endemic to Palk Bay. Hunting, killing, capturing, or trading of any native bird & mammal species including migrants (except for a few introduced animals or for certain circumstances), & taking or destroying the eggs or nests of any bird, are punishable offences as per Fauna and Flora Protection Ordinance (FFPO) in Sri Lanka. Among the target animals, only the Wild boar was not legally protected. In spite of having access to alternative sources of protein, people still preferred bushmeat, largely due to the taste of meat. Nevertheless, we understood that poaching has largely been reduced over the years, due to increased visibility, changed life styles & presence of armed forces in the area.

Majority of the respondents observed how wildlife/ birdlife & forest cover around Korakulam reduced over the years & were aware of the encroachment in the area. A temporal comparison of satellite images of the site showed that clearing of the scrubland habitat at both sides of the main road began around 2011 (Figure 33). It can be seen how deforestation gradually increased thereafter, over the last decade. By 2017, >80% of the scrubland was removed. Though the land area located north to the main road was privately owned, the narrow stretch of land sandwiched between the main road & tank, falls within the boundaries of both DAD's tank reservation & DWC's Nature Reserve. (The site was declared a Nature Reserve in 2016. Yet it was protected by DAD even before). After 2017, the pace of constructing settlements within & outside the protected area was further accelerated.



Figure 33: A temporal comparison of forest cover & clearing around Korakulam, from 2006-2023 (Source: Google Earth)

Accordingly, on the contrary to the decreasing trend in poaching, the threat of encroachment was found to be aggravating. Political influence & poor enforcement of law by the authorities had pushed encroachment & deforestation in the area. Therefore, it is important that the responsible authorities (DWC & DAD) conduct regular monitoring at the site & enforce the law to prevent further destruction at the site to ensure the continued protection of wildlife.

Most of the respondents were not aware that the site is protected either by DWC or DAD (The site lacked any kind of a sign board). Nevertheless, they largely identified the eco-system services provided by the site. Mostly the new settlers did not see the value of the tank. However, the respondents' perception towards protection of the site was mostly positive. Therefore, promoting awareness and education about the importance of conservation, & community engagement through promoting eco-tourism which will economically benefit the local communities can also help to reduce these threats in the long run.

Korakulam is known for, among the limited birding community who make frequent visits to Mannar, as a spot for rarities. Despite facing various threats, the site has recorded several rare species over the last five-year period (2017-2022), including Bar-headed Goose, Ruddy Shelduck, Grey-headed Lapwing, Jack Snipe, Streak-throated Swallow & Northern Wheatear. Notably, the Bar-headed Goose and Northern Wheatear represent the first documented occurrences of these species in Sri Lanka, while the others remain infrequent vagrants or rare visitors to the country. The presence of these rarities along with more regular charismatic migrants (as Greater Flamingo) underscores the importance of conserving the habitats that support them and promoting sustainable birdwatching tourism practices in the area.

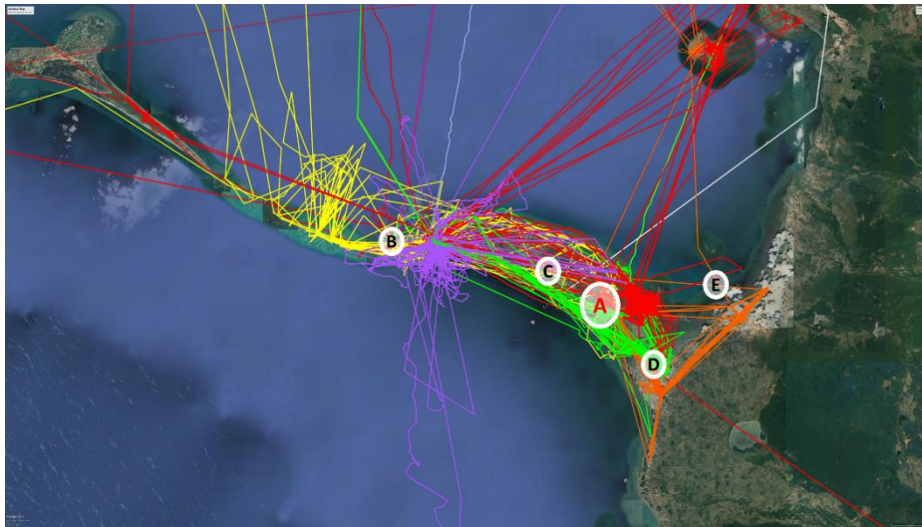


Figure 33: Connectivity of Korakulam with the other wetlands in Mannar; (A) Korakulam tank, (B) Taleimannar beach, Rama's Bridge and Urumalei mudflat, (C) Puthukkudiyiruppu - Erukkalampiddy lagoon, (D) Vankalei Sanctuary & (E) Veditaltitvu Nature Reserve (Source: Panagoda et al., 2022, MANNAR ISLAND; A CENTRE FOR THE MOVEMENT OF WATERBIRDS WITHIN THE PALK BAY AND GULF OF MANNAR)

Figure 33 illustrates the movement of 21 individuals of 11 waterbirds species across Mannar Island, connecting Korakulam to four main critical wetlands in the area; (B) Taleimannar beach, Rama's Bridge and Urumalei mudflat, (C) Puthukkudiyiruppu – Erukkalampiddy lagoon, (D) Vankalei Sanctuary & (E) Veditalitivu Nature Reserve (Source: CAF - Sri Lanka Waterbird Tracking Project). Korakulam, being the only freshwater lake in Mannar island, was regularly visited by tagged Eurasian Wigeons, Heuglin's Gulls & Brown-headed Gulls to satisfy their daily needs. The tagged birds further revealed Korakulam's connectivity with the wetlands in the Palk Bay-Gulf of Mannar region & within the broader Central Asian Flyway. This continental scale connectivity further highlights the importance of preserving this wetland habitat for the birds of CAF.

The project activities greatly helped to bring the attention of government authorities & local NGOs & business (hoteliers), to this critical site. We could further increase the awareness of the local community on the economical & conservation value of the site & create a platform to inspire & engage the younger generation in biodiversity conservation, in the long run.

6.0 Acknowledgements

The project team greatly acknowledges the support received from Department of Wildlife Conservation, Department of Agrarian Development, Mannar District & Divisional Secretariats & Sri Lanka Police, for their approvals, guidance & various support throughout the project. Our sincere thanks are with Oriental Bird Club for funding the project & Mr. Paul Insua-Cao for coordination & guidance. We appreciate the additional financial support received from Wildlife & Nature Protection Society (WNPS) of Sri Lanka for replanting activities of the site & UNDP Sri Lanka for hosting the opening ceremony & stakeholder meetings. We are also thankful to Cley Spy Ltd for their generous donations of the optics & various bird enthusiasts from Sri Lanka for their donations for Mannar Bird Club. We are also thankful to the Zonal Education office, Mannar, local schools, Palmyrah House Pvt Ltd & UNDP Sri Lanka for their various support in conducting awareness & training programs.

7.0 Appendix

Table 2: A checklist of birds encountered in Korakulam during the survey period (2021 December-2022 November)

			Status in Sri Lanka	Conservation status (national)	Conservation status (global)
Order GALLIFORMES					
	Phasianidae				
1	Indian Peafowl	<i>Pavo cristatus</i>	R	LC	LC
2	Grey Francolin	<i>Francolinus pondicerianus</i>	UR	NT	LC
Order ANSERIFORMES					
	Anatidae				
3	Lesser Whistling-duck	<i>Dendrocygna javanica</i>	R	LC	LC
4	Cotton Pygmy-goose	<i>Nettapus coromandelianus</i>	UR	NT	LC
5	Garganey	<i>Spatula querquedula</i>	M		LC
6	Northern Shoveler	<i>Spatula clypeata</i>	SM		LC
7	Eurasian Wigeon	<i>Mareca penelope</i>	M		LC
8	Indian Spot-billed Duck	<i>Anas poecilorhyncha</i>	HSR, SM	CR	LC
9	Northern Pintail	<i>Anas acuta</i>	M		LC
10	Common Teal	<i>Anas crecca</i>	SM		LC
Order PHOENICOPTERIFORMES					
	Podicipedidae				
11	Little Grebe	<i>Tachybaptus ruficollis</i>	R	LC	LC
	Phoenicopteridae				
12	Greater Flamingo	<i>Phoenicopterus roseus</i>	M		LC
Order COLUMBIFORMES					
	Columbidae				
13	Rock Dove	<i>Columba livia</i>			
14	Eurasian Collared-dove	<i>Streptopelia decaocto</i>	UR	NT	LC
15	Western Spotted Dove	<i>Spilopelia suratensis</i>	CR	LC	LC
16	Orange-breasted Green-pigeon	<i>Treron bicinctus</i>	R	LC	LC
Order CAPRIMULGIFORMES					
	Apodidae				
17	Asian Palm-swift	<i>Cypsiurus balasiensis</i>	R	LC	LC
Order CUCULIFORMES					
	Cuculidae				
18	Greater Coucal	<i>Centropus sinensis</i>	CR	LC	LC
19	Jacobin Cuckoo	<i>Clamator jacobinus</i>	UR	LC	LC
20	Western Koel	<i>Eudynamys scolopaceus</i>	CR	LC	LC
Order GRUIFORMES					
	Rallidae				
21	White-breasted Waterhen	<i>Amaurornis phoenicurus</i>	CR	LC	LC
22	Purple Swampphen	<i>Porphyrio porphyrio</i>	R	LC	LC
23	Common Moorhen	<i>Gallinula chloropus</i>	R	LC	LC
24	Common Coot	<i>Fulica atra</i>	UR, SM	LC	LC
Order CICONIIFORMES					
	Ciconiidae				

25	Painted Stork	<i>Mycteria leucocephala</i>	R	LC	NT
26	Asian Openbill	<i>Anastomus oscitans</i>	R	LC	LC
Order PELECANIFORMES					
	Threskiornithidae				
27	Glossy Ibis	<i>Plegadis falcinellus</i>	SR, SM		LC
28	Black-headed Ibis	<i>Threskiornis melanocephalus</i>	R	LC	NT
29	Eurasian Spoonbill	<i>Platalea leucorodia</i>	UR	LC	LC
	Ardeidae				
30	Yellow Bittern	<i>Ixobrychus sinensis</i>	UR, M	NT	LC
31	Indian Pond-heron	<i>Ardeola grayii</i>	CR	LC	LC
32	Cattle Egret	<i>Bubulcus ibis</i>	CR	LC	LC
33	Grey Heron	<i>Ardea cinerea</i>	R	LC	LC
34	Great White Egret	<i>Ardea alba</i>	CR	LC	LC
35	Intermediate Egret	<i>Ardea intermedia</i>	CR	LC	LC
36	Little Egret	<i>Egretta garzetta</i>	CR	LC	LC
	Pelecanidae				
37	Spot-billed Pelican	<i>Pelecanus philippensis</i>	R	LC	NT
Order SULIFORMES					
	Phalacrocoracidae				
38	Little Cormorant	<i>Microcarbo niger</i>	CR	LC	LC
39	Indian Cormorant	<i>Phalacrocorax fuscicollis</i>	CR	LC	LC
	Anhingidae				
40	Oriental Darter	<i>Anhinga melanogaster</i>	UR	LC	NT
Order CHARADRIIFORMES					
	Jacanidae				
41	Pheasant-tailed Jacana	<i>Hydrophasianus chirurgus</i>			
	Burhinidae				
42	Great Thick-knee	<i>Esacus recurvirostris</i>	UR	LC	LC
	Recurvirostridae				
43	Black-winged Stilt	<i>Himantopus himantopus</i>	CR, M	LC	LC
	Charadriidae				
44	Pacific Golden Plover	<i>Pluvialis fulva</i>	M		LC
45	Little Ringed Plover	<i>Charadrius dubius</i>	UR, UM	VU	LC
46	Kentish Plover	<i>Charadrius alexandrinus</i>	UM	VU	LC
	Hanuman Plover		UR		
47	Lesser Sandplover	<i>Charadrius mongolus</i>	M		LC
48	Yellow-wattled Lapwing	<i>Vanellus malabaricus</i>	UR	LC	LC
49	Red-wattled Lapwing	<i>Vanellus indicus</i>	CR	LC	LC
	Rostratulidae				
50	Greater Painted-snipe	<i>Rostratula benghalensis</i>	UR	VU	LC
	Scolopacidae				
51	Whimbrel	<i>Numenius phaeopus</i>	UM		LC
52	Eurasian Curlew	<i>Numenius arquata</i>	UM		NT
53	Black-tailed Godwit	<i>Limosa limosa</i>	M, HSM		NT
54	Ruddy Turnstone	<i>Arenaria interpres</i>	M		LC
55	Curlew Sandpiper	<i>Calidris ferruginea</i>	CM		NT
56	Little Stint	<i>Calidris minuta</i>	CM		LC
57	Terek Sandpiper	<i>Xenus cinereus</i>	UM		LC
58	Common Sandpiper	<i>Actitis hypoleucos</i>	M		LC

59	Common Greenshank	<i>Tringa nebularia</i>	UM		LC
60	Common Redshank	<i>Tringa totanus</i>	CM		LC
61	Wood Sandpiper	<i>Tringa glareola</i>	M		LC
62	Marsh Sandpiper	<i>Tringa stagnatilis</i>	CM		LC
	Laridae				
63	Brown-headed Gull	<i>Larus brunnicephalus</i>	M		LC
64	Pallas's Gull	<i>Larus ichthyaetus</i>	M		LC
65	Heuglin's Gull	<i>Larus fuscus heuglini</i>	M		LC
66	Little Tern	<i>Sternula albifrons</i>	R	VU	LC
67	Common Gull-billed Tern	<i>Gelochelidon nilotica</i>	CM	CR	LC
68	Caspian Tern	<i>Hydroprogne caspia</i>	M	CR	LC
69	Whiskered Tern	<i>Chlidonias hybrida</i>	CM		LC
70	White-winged Tern	<i>Chlidonias leucopterus</i>	M		LC
71	Common Tern	<i>Sterna hirundo</i>	SR, SM, M	CR	LC
Order ACCIPITRIFORMES					
	Accipitridae				
72	Booted Eagle	<i>Hieraaetus pennatus</i>	SM		LC
73	Shikra	<i>Accipiter badius</i>	R	LC	LC
74	White-bellied Sea-eagle	<i>Haliaeetus leucogaster</i>	UR	LC	LC
75	Brahminy Kite	<i>Haliastur indus</i>	R	LC	LC
76	Black Kite	<i>Milvus migrans</i>	SR, M	LC	LC
Order BUCEROTIFORMES					
	Upupidae				
77	Common Hoopoe	<i>Upupa epops</i>	UR	LC	LC
Order CORACIIFORMES					
	Meropidae				
78	Asian Green Bee-eater	<i>Merops orientalis</i>	R	LC	LC
79	Blue-tailed Bee-eater	<i>Merops philippinus</i>	CM	CR	LC
	Coraciidae				
80	Indian Roller	<i>Coracias benghalensis</i>	R	LC	LC
	Alcedinidae				
81	Common Kingfisher	<i>Alcedo atthis</i>	R	LC	LC
82	White-breasted Kingfisher	<i>Halcyon smyrnensis</i>	CR	LC	LC
Order PICIFORMES					
	Megalaimidae				
83	Brown-headed Barbet	<i>Ptilinopus zeylanicus</i>	CR	LC	LC
Order PSITTACIFORMES					
	Psittacidae				
84	Rose-ringed Parakeet	<i>Psittacula krameri</i>	CR	LC	LC
Order PASSERIFORMES					
	Oriolidae				
85	Black-hooded Oriole	<i>Oriolus xanthornus</i>	R	LC	LC
	Dicruridae				
86	Black Drongo	<i>Dicrurus macrocercus</i>	UR	LC	LC
	Laniidae				
87	Brown Shrike	<i>Lanius cristatus</i>	CM, SM		LC
	Corvidae				
88	House Crow	<i>Corvus splendens</i>	CR	LC	LC
89	Large-billed Crow	<i>Corvus macrorhynchos</i>	R	LC	LC

	Alaudidae				
90	Ashy-crowned Sparrow-lark	<i>Eremopterix griseus</i>	UR	LC	LC
91	Jerdon's Bushlark	<i>Mirafra affinis</i>	R	LC	LC
92	Oriental Skylark	<i>Alauda gulgula</i>	UR, SR	LC	LC
	Cisticolidae				
93	Zitting Cisticola	<i>Cisticola juncidis</i>	R	LC	LC
94	Plain Prinia	<i>Prinia inornata</i>	R	LC	LC
95	Common Tailorbird	<i>Orthotomus sutorius</i>	CR	LC	LC
	Hirundinidae				
96	Barn Swallow	<i>Hirundo rustica</i>	CM, UM, SM		LC
	Pycnonotidae				
97	Red-vented Bulbul	<i>Pycnonotus cafer</i>	CR	LC	LC
98	White-browed Bulbul	<i>Pycnonotus luteolus</i>	R	LC	LC
	Leiotrichidae				
99	Yellow-billed Babbler	<i>Turdoides affinis</i>	CR	LC	LC
	Sturnidae				
100	Rosy Starling	<i>Pastor roseus</i>	M		LC
101	Common Myna	<i>Acridotheres tristis</i>	CR	LC	LC
	Muscicapidae				
102	Oriental Magpie-robin	<i>Copsychus saularis</i>	CR	LC	LC
103	Indian Robin	<i>Saxicoloides fulicatus</i>	R	LC	LC
	Nectariniidae				
104	Purple-rumped Sunbird	<i>Leptocoma zeylonica</i>	CR	LC	LC
105	Purple Sunbird	<i>Cinnyris asiaticus</i>	R	LC	LC
	Estrildidae				
106	Scaly-breasted Munia	<i>Lonchura punctulata</i>	R	LC	LC
	Passeridae				
107	House Sparrow	<i>Passer domesticus</i>	R	LC	LC
	Motacillidae				
108	Paddyfield Pipit	<i>Anthus rufulus</i>	R	LC	LC

Key References for Checklist

BirdLife International (2016) Handbook of the Birds of the World and BirdLife International digital checklist of the birds of the world. Version 9. Available at:

http://datazone.birdlife.org/userfiles/file/Species/Taxonomy/BirdLife_Checklist_Version_90.zip

de Silva Wijeyeratne, G., 2020. *A Naturalist's Guide to the birds of Sri Lanka*. 3rd ed. John Beaufoy Publishing.

Acronyms (as in status in Sri Lanka):

E – Endemic

M – Migrant, CM – Common Migrant, SM – Scarcely Migrant, Highly Scarcely Migrant

R - Resident, CR – Common Resident, SR – Scarcely Resident, Highly Scarcely Resident

V – Vagrant

*When some species have two or more subspecies (races) recorded in Sri Lanka, the status of each subspecies is given.

Acronyms (as in conservation status):

CR – Critically Endangered, EN – Endangered, VU – Vulnerable, NT – Near Threatened

LC – Least Concern

Questionnaire - nature and extent of poaching in *Korakulam, Mannar*

Date:

Location:

Observer:

Section 1 - Background information

1. Name (optional)
2. Age category: >10 | 11-18 | 19-25 | 26-35 | 36-50 | 51-65 | <65
3. Gender: M|F
4. Contact number (optional)
5. Education level: >no schooling | up to O|L | AL | Graduate | post-graduate
6. Ethnicity: Sinhalese | Tamil | Muslim | Burgher | other
7. Occupation:
8. Marital status: married | unmarried
9. Household size: 1 – 3 | 4 – 6 | 6<
10. Distance to PA: <200 m | 201 m - 500 m | 501 m – 1000 m | >1000 m
11. Duration of residence: less than 1 year|1-5 year | 5-19 years | 20-39 years | more than 40 years

Section 2 – Poaching & egg raiding

1. Are you aware of poaching in the area? Yes | No | No idea
2. Are you aware of egg raiding in the area? Yes | No | No idea
3. What is the main purpose of poaching/ egg raiding?
Source of income | Source of food | Recreation | Nuisance
Other:.....
4. Season of poaching/ egg raiding:
5. How often do you notice poaching/ egg raiding?
6. Poaching method:
7. Access to alternative sources of protein
Fish | Poultry | Meat (beef/pork) |
Other

Section 3 - Target species

1. Major group of animals targeted: Bird | Mammal
2. Type of bird targeted:
3. Types of mammals targeted:
4. Reason for targeting: Taste of meat | Easy to catch | Nutritional value
Other

Section 4 - Involved parties

1. Poach as: a group activity | an individual activity |
other
2. Age group of poachers 10-18 | 19 -29 | 30 -49| 50 -65 | <65
3. Do you sell meat | are there hunters coming from outside | are there buyers to supply

Section 5 – Deterioration of the site

- a. Wildlife is less abundant now than in the past: Yes | No | No idea

- b. The water quality of the lake is deteriorating: Yes | No | No idea
- c. The scrubland around the lake has been reduced over the years: Yes | No | No idea
- c. The breeding activities of the birds have reduced over the years: Yes | No | No idea

Section 6 – Encroachment

- 1. Who are the land owners around Korakulum?
- 2. Are you aware of encroachment in the area? Yes | No | No idea
- 3. Reasons for encroachment: Livestock rearing | Paddy farming/ farming | Residence expansion | Satisfying daily needs
Other
- 4. If yes; who are they?

Section 7 - Perception

a. Awareness of the local community on the importance of the site

- Are you aware that this site is a protected site?
- Are you aware of the importance of the area as a source of water?
- Are you aware of the importance of the area as a site of breeding?
- Are you aware of migratory birds being in the area?

b. Perception of the local community towards poaching

- Poaching is a tradition
- Poaching is a nature experience
- Poaching is a source of income
- Ability to hunt is an essential life skill
- Ability to hunt adds value to an individual
- Other

c. Their perception towards protection of the site

- The site needs protection
- People's needs are more important than wildlife protection

Special notes

other: