

Final Evaluation Report

Your Details	
Full Name	See Choon Min
Project Title	A Community Participatory Approach to Address Critical Knowledge Gaps for Conservation of Lesser Adjutant (<i>Leptoptilos javanicus</i>)
Application ID	35141-1
Date of this Report	12-January-2022

1. Indicate the level of achievement of the project's original objectives and include any relevant comments on factors affecting this.

Objective	Not achieved	Partially achieved	Fully achieved	Comments
To address the critical knowledge gaps on the ecology, distribution, population status of the species in NCSC through monthly structured surveys within the first ten months of the projects				
To identify and monitor the threats towards the Lesser Adjutant along the NCSC through monthly participatory habitat monitoring with the local community within the first ten months of the project				

2. Describe the three most important outcomes of your project.

a). Revealing the critical knowledge gaps of population status.

The lesser adjutant surveys provided a baseline information on the ecology and identified their habitat requirements.

The 6-monthly surveys produce a population estimates of 97 individuals and showed that this coast is supporting one of the largest remaining populations of lesser adjutant in Malaysia. The most recent migratory waterbird surveys conducted by MNS in 2019 (Yeap 2020) documented 23 individuals. This new survey revealed that the NCSC is supporting higher numbers of the lesser adjutants than previously thought. It further reiterated the importance of NCSC to the future survival of this stork species.

b). Revealing information on distribution of Lesser Adjutant local distribution and identify focal locations for undertaking conservation action in future.

Based on the surveys, the distribution of the lesser adjutants is concentrated at the largest remaining mangrove forest patch in Selangor Coast, Kuala Bernam Forest Reserve (northern section) and Klang Islands (southern section) (Figure 6). These Forest Reserves are strongholds for the adjutant populations.

Mangrove forest reserves in north section are disjointed and thinly stretched along the coast with development happening rapidly from the islands. The disjointed mangrove forest in north section is collectively known as Kuala Bernam Forest Reserve. At the largest remaining intact patch of Kuala Bernam Forest Reserve, we have identified the mangrove forest and the sheltered wide extent of intertidal mudflat, named Teluk Rhu is serving as an important high tide roosting site for the migratory shorebirds including Eurasian curlew, bar-tailed godwit, black-tailed godwit and great knot (Yeap, 2020).

In Yeap (2020), the maximum count of lesser adjutant recorded in Teluk Rhu is 15 individuals. The number of lesser adjutant recorded in this survey has set a high record for the survey with a maximum count of 22 individuals recorded. The concentration of the lesser adjutant observed in Kuala Bernam Forest Reserve is as shown in Figure 1.



Figure 1. Distribution of Lesser Adjutant in Northern section of the North-central Selangor Coast.

The south section of NSCS is generally mangrove-poor with exception of Kapar Forest Reserve and Klang Islands. The Klang Islands are made up of a group of several mangrove islands of different sizes and vast mudflats during low tides. The islands are known as Klang Island, Ketam Island, Tengah Island, Che Mat Zin Island, Selat Kering

Island, and Pintu Gedong Island. In the 2019 NCSC coastal survey (Yeap, 2020), Klang Islands were not surveyed due to time constraints.

In this survey, we were only able to cover surveys at Ketam Island and Tengah Island. However, the survey has yielded a high count of lesser adjutant with a maximum count of 41 and 19 individuals recorded on Ketam Island and Tengah Island respectively. The number of lesser adjutant recorded in the two islands is the highest amongst all point count stations in NCSC as shown in figure 2.

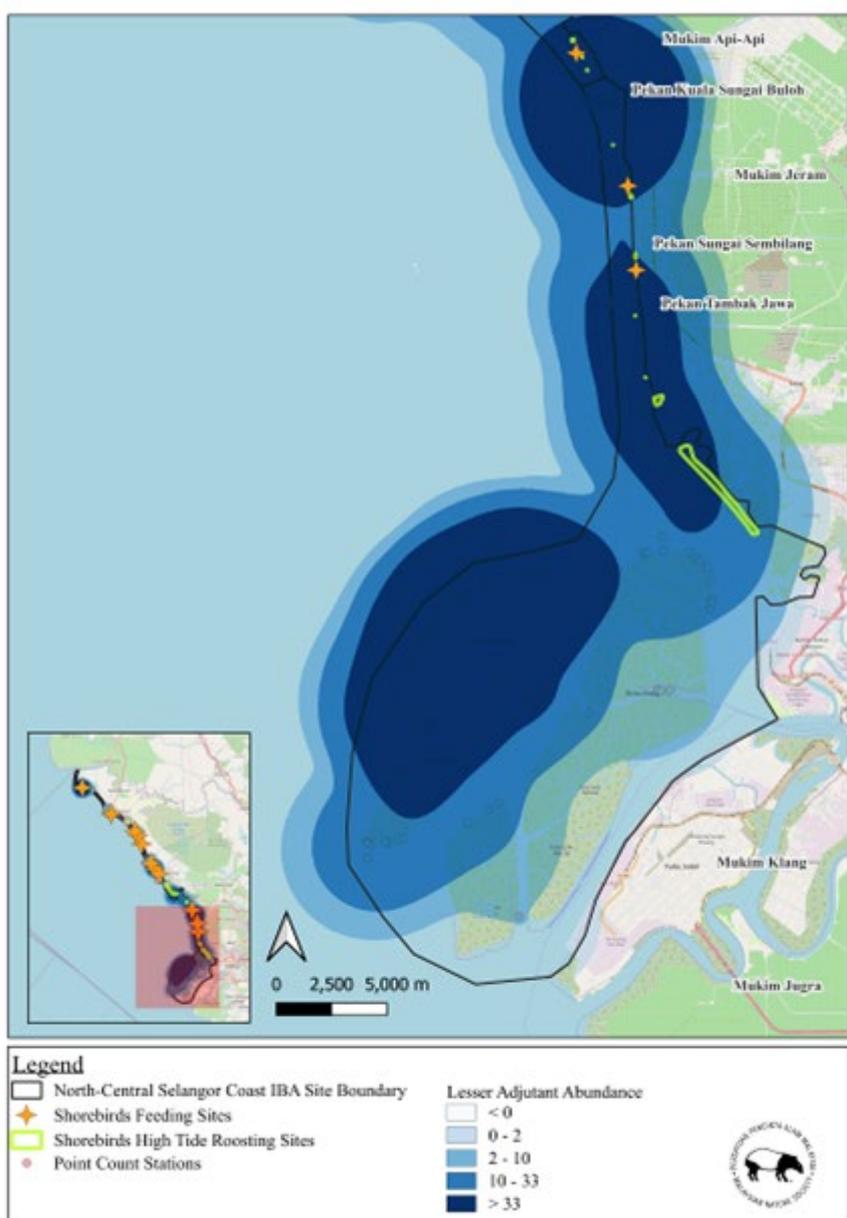


Figure 2. Distribution of Lesser Adjutant in Southern region of the Selangor Coast.

The result of this survey indicated that the Klang Island's intact and mature mangrove forests are important habitat for the lesser adjutant. Although we were only able to cover two of the six mangrove islands within the Klang Island group,

survey results pointed to possible higher numbers of adjutants if remaining islands were surveyed.

c). Identified associated threats of Lesser Adjutant and Improved understanding on the perceptions of local community onto Lesser Adjutant

Semi-structured interviews to gather data regarding the level of knowledge, attitude, and perception towards the lesser adjutant among the north-central Selangor Coast (NCSC) local communities were completed with 30 informants from the locality of NCSC. The semi-structured interview data were analysed by using qualitative content analysis. The results of qualitative analysis were given in four main categories, namely (1) knowledge about lesser adjutant and other waterbirds; (2) attitude towards lesser adjutant; (3) perception of threats towards the wetland and the lesser adjutant; and (4) protection status of lesser adjutant in Malaysia.

The key finding from the semi-structured interviews including:

1) All lesser adjutant are observed concentrating on large mangrove forest patch with preference to perch on tall trees. Fishermen in Klang Islands highlighted their observation on lesser adjutant nesting on *Rhizophora* spp (locally known as Bakau Minyak) and *Xylocarpus* spp (locally known as Pokok Nyireh). Pokok Nyireh are also used by the local indigenous community, Mah Meri Tribe for carving spiritual masks to be used in ceremonial and festive purposes such as interaction with ancestral spirits and cultural dances. Fishermen interviewed in Klang Islands are part of the Mah Meri Indigenous community. They shared their knowledge on their culture, lesser adjutant ecology and the importance of these mangrove trees and the birds to them.

2) Attitude of the fishermen community towards lesser adjutant differs depending on their locality. In Klang Islands, where their community are closely related to the forest and mangrove, lesser adjutant holds importance as part of the nature. Fishermen community in Buloh river views lesser adjutant as unique entity of the coastal wetland and the indicator for healthy wetlands. However, in fishermen from the northern section (Sabak Bernam) are slightly displeased by the lesser adjutant due to the stork's behaviour in stealing fish from their fishing net. However, the fishermen do not consider the lesser adjutant as major threats to their harvest. The fishermen claimed that pollutants discharged from aquaculture ponds from pond cleaning is the bigger threat that affects their harvests. The verdict was then confirmed by observations pointed out by the fishermen during species survey as shown in Figure 3.

Participatory mappings were conducted with the fishermen communities and the result are showing consistency with the distribution result we obtained from lesser adjutant species survey (Figure 4).



Figure 3. A Lesser Adjutant stealing fish from the fishing net during low tide. **Figure 4.** Participatory mapping with two local fishermen in Pulau Ketam. Interviewers, Chen Foong Ling were explaining the Selangor coastal map printed for the fishermen to sketch and add their information onto the map.

Fishermen in Sabak Bernam claimed to have seen 22 lesser adjutant in Teluk Rhu, part of Kuala Bernam Forest Reserve. Whereas fishermen from Buloh river mentioned that they have seen up to 40 lesser adjutant back in 2015/16 and about only 12 to 17 individuals now.

The observations from the fishermen were consistent with the result of species survey where a maximum count of 22 individuals was recorded in Teluk Rhu and 15 individuals in Buloh River mouth. Fishermen in Klang Islands claimed to have seen 50 individuals on Pulau Ketam, and our survey results showed that the maximum count in one survey trip is 107 individuals.

The most significant achievement of this project is the identification of the priority sites for subsequent lesser adjutant conservation. In Peninsular Malaysia, the lesser adjutant population is estimated to be less than 250 (Wells, 1999). However, there are no updates of lesser adjutant population in Selangor since then due to the lack of long-term species monitoring for lesser adjutant.

In South-East Asia, lesser adjutant is essentially distributed in coastal area. Prior this project, research published related to lesser adjutant was mainly as part of biodiversity assessment in coastal wetland. There are no studies that focus on the ecology of lesser adjutant nor local fishermen's knowledge of the species.

Knowledge and perception survey on lesser adjutants in fishing communities have helped us in identifying the associated threats. Knowledge sharing by the indigenous community has revealed the needs for investigation into ethnozoology perspective of lesser adjutant and documentation of traditional knowledge on wildlife species in coastal indigenous community of Malaysia.

Identification of the priority sites and how the respective communities have different perspectives has provided the key information for conservation planning or more in-depth species monitoring for this globally threatened species.

3. Explain any unforeseen difficulties that arose during the project and how these were tackled.

The project was undertaken along the north-central Selangor Coast, which is one of the Peninsular Malaysia's most productive coastal fisheries and important migratory shorebird staging/wintering site. However, this site is currently impacted by pollution, coastal erosion, commercial aquaculture and agriculture, coastal infrastructure development and to lesser extent illegal trapping of waterbirds.

The dynamic coastline is one of the main attributes to the unforeseen difficulties faced during the project implementation. Based on State of the River Report published by Selangor Water Management Authority (LUAS, 2021), there are 13 main tributaries flowing into the Selangor River and eight sub-basins. The Kuala Selangor sub-basin (259.59 km²) is situated downstream of Selangor River. This sub-basin is dominated by agricultural lands and mangroves flanked the riverside and river mouth. During nest searches along the river tributaries, it was observed that parts of the mangrove forests along the river were cleared and being fragmented as shown in figure below.



Figure 5. On-going construction of new jetty at river mouth of Sekinchan, Kuala Selangor.



Figure 6. On-going mangrove reclamation for aquaculture pond along the river at Jeram, Kuala Selangor.

Nest searches were conducted in all major rivers and surveys were conducted along the river. Due to the rapid changes in land use along the tributaries and the mangrove forest fragmentation happening faster than we anticipated, we surveyed the river as far as the forested areas were found and documented the situation along the rivers.

The forest reserves along the north-central Selangor Coast are as follows: Banjar North, Kapar, Kuala Bernam, and Klang Islands. The Klang Islands comprised of multiple mangrove islands including (1) Pulau Tengah, (2) Pulau Ketam, (3) Pulau Che Man Zin, (4) Klang, (5) Pintu Gedong, (6) Rusa, (7) Selat Kering, (8) Selat Mahang, (9) Selat Meriam, and (10) Tonggok. Pulau Ketam is the only mangrove island among the Klang Islands with fishermen communities living on the island.

No nest was located along the river, despite consistent observation of high numbers of lesser adjutants. The adjutants were concentrated in the remaining forest reserves namely Banjar North, Kuala Bernam, Kapar and Klang Islands as shown in Figure 7. These forest reserves face certain threats.

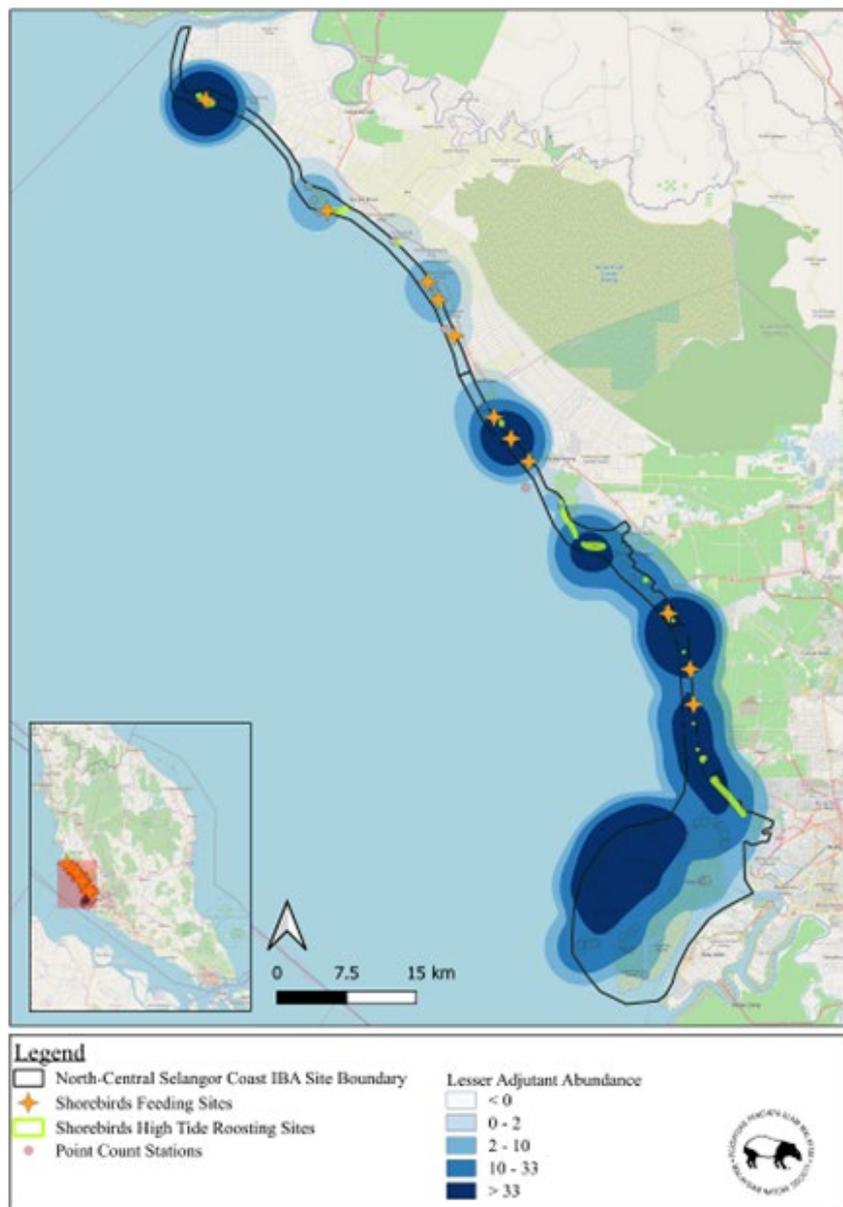


Figure 7. Heat map of Lesser Adjutant based on survey results.

These difficulties faced during surveys resonated with the challenges faced by lesser adjutants to survive along the north-central Selangor Coast. This fuels concerns on their population viability along this coastline and the urgency of conservation action to be taken to address this situation.

Based on the heat map shown in Figure 7, one of the biggest remaining populations of lesser adjutant is found on the southern section of NCSC i.e., the Klang Islands. The Klang Islands are a group of mangrove islands, one of the largest remaining forest reserves in Selangor. The unforeseen difficulty is the short time frame of accessibility to the rivers in mangrove forest. The rivers can only be surveyed within 2 hours via boat as far deep into the forest before the rising tide submerges the entrances completely during high tide.

After the first 2-month recce and advised by our boatman, who is from the indigenous Mah Meri tribe from Klang Islands, we conducted the surveys during dead tide as shown in Figure 8, to be able to access the rivers and avoid being stranded inside the mangrove islands during low tides. Besides, sea conditions during monsoon season in late December and January were too risky for conducting surveys, which resulted in an information gap during the surveys.



Figure 8. Nest search of Lesser Adjutant along the river of Klang Islands.

The third unforeseen difficulties are conducting monthly meeting and semi-structured interviews with local communities along the north-central Selangor Coast with 100 individuals within the course of 10 months. The knowledge and perception survey on lesser adjutant in this project adopt methodology used in Katuwal et al. (2021) on farmland communities and adapted to suit the context of interviewing the fishermen communities.

Regular monthly meetings were challenging because it involves commitment from the fishermen at their expense of time to earn a living by missing the suitable tide to fish. Therefore, questions for surveys were revised for better fit into the context of fishermen communities. Instead of monthly meetings, we used snowball methods to identify the fishermen to be interviewed and reached out to them in a smaller group setting and with appointments that account for flexibility to accommodate their time.



Figure 9. Semi-structured interviews conducted with fishermen from Buloh river.

To accommodate the availability of local communities for interviews, the time taken to complete semi-structured interviews took longer than planned. However, we were able to secure meeting with 30 informants who are open and receptive to be interviewed. The semi-structured interviews were conducted as shown in Figure 9.

4. Describe the involvement of local communities and how they have benefited from the project.

Local communities are integral part of this project. The three main communities we have engaged and recruited in the surveys are from Sabak Bernam, Kuala Selangor and Klang Islands. Fishermen communities from Sabak Bernam and Kuala Selangor are mainly Malay community whose livelihood depends on fishing and cockle farming. Fishermen community from Klang Islands are Mah Meri indigenous community who live on the Pulau Ketam, one of the mangrove islands in Klang district.

All three fishing communities are involved directly in our species survey and had supported us by driving boats, providing information on lesser adjutant sightings and participated in our surveys.

A workshop to capacity build fishermen community from Klang Islands, Mah Meri Indigenous community and youth from Pulau Ketam Chinese community who

expressed interest in joining our boat survey for lesser adjutant nest searches and species survey. A brief training on method to use GPS unit, laser rangefinder, and data records were given to the workshop participants as shown in figures below.



Figure 10. Youth from Pulau Ketam Chinese Community were taught on how to use binoculars. **Figure 11.** The survey was conducted together with the community. **Figure 12.** Indigenous community from Pulau Ketam were taught how to use camera, GPS unit, laser rangefinder and data recording.

5. Are there any plans to continue this work?

Yes, based on the project outcome. There are planning to continue lesser adjutant conservation work including:

- Understand and monitor the land use changes of the key importance sites identified from this project for deriving conservation strategies.
- Investigate the ethnozoology perspective of lesser adjutant and documentation of traditional knowledge on wildlife species in coastal indigenous community of Malaysia.
- Undertake more intensive and systematic search of lesser adjutant nesting on Klang Islands.
- Produce communication and awareness materials in local languages (Bahasa Melayu and Mandarin) to increase outreach to the local fishermen communities.

6. How do you plan to share the results of your work with others?

The results are currently being analysed further and compiled into a technical report that will be shared with key government agencies and local governments in NCSC. The project outcome will be visualised in an infographic poster and distributed among the local communities we worked with. Lastly, we plan to publish the survey results in scientific journal .

7. Looking ahead, what do you feel are the important next steps?

The important next step for this project is to increase the scale of nest searches in Klang Islands by improve the approach by undertaking more systematic methods other than transect along the river and investigate deeper into the mangrove forests. Besides, it is equally importance to investigate the ethnozoology perspective of lesser adjutant and document the local indigenous traditional knowledge on its associated mangrove forest.

8. Did you use The Rufford Foundation logo in any materials produced in relation to this project? Did the Foundation receive any publicity during the course of your work?

The Rufford Foundation logo has yet to be used in any materials produced from this project. We are planning to place Rufford Foundation logo in poster and brochure that will be produced to share project outcome with local communities.

The team is currently drafting communication plan and produce social media content to increase the outreach of lesser adjutant conservation to the public.

9. Provide a full list of all the members of your team and their role in the project.

Dr Yong Ding Li (BirdLife International)

Dr Yong's main role is to advise the team members on ground on the ecological study of Lesser Adjutant and guidance on conservation approach that we can take to conserve Lesser Adjutant. Dr Yong has also supported the team by connecting the team member with Malaysian bird experts for the team member to interview for historical information of Lesser Adjutant in Malaysia. Besides, he has connected the team with Hong Kong Bird Watching Society where the society has co-funded this project in support part of the expenses in species survey and nest search.

Chen Foong Ling (Malaysian Nature Society)

Chen is the education officer who is well versed in local community engagement and has good background on social science from to her ongoing master study. We developed the semi-structured interviews questionnaires and conducted the semi-structured interview together. Discussion was made together to revise the survey methods and improvised the questionnaires that better fit for the context of coastal communities.

10. Any other comments?

Reference

Katuwal, H.B., Zhang, M., Baral, H.S., Sharma, H.P. & Quan, R. (2021). Assessment of farmers' knowledge and perceptions towards farmland birds show the need of xonservation interventions. *Global Ecology and Conservation*, 27, Article e01563.

Lembaga Urus Air Selangor (2021). State of the River Report 2019: Sungai Selangor. Lembaga Urus Air Selangor. <https://www.luas.gov.my/images/penerbitan/SOR/LUAS%20SOR%20Sg%20Selangor%202019.pdf?ts=1692522468733>