Final Evaluation Report

Your Details	
Full Name	Daphawan Khamcha
Project Title	Breeding ecology, nest-site characteristics, and nesting success of the globally endangered Giant Nuthatch (*Sitta magna*) in mature pine plantation
Application ID	35713-2
Date of this Report	30 October 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
identify the main characteristics of the breeding habitat of Giant Nuthatch				We found only seven active cavity nests of giant nuthatch in the breeding season from February to May 2022. The breeding habitat was dominated by mature pine (*Pinus Kesiya*) plantation (>95%) with low evidence of recent fire and the canopy cover was ~75%. Cavity nests were either in the natural holes such as cracks in the trunk of the living pine trees (*Pinus kesiya*) or broadleaved trees or cavity excavated by other animals.
assess the effects of habitat characteristics and other factors on nesting success of Giant Nuthatch				Based on the small number of sample size, only seven cavity nests, we found no significant nest/habitat characteristics, or any factors impacting on nest success.
to discuss the adaptive significance of the relationships between pine plantation and Giant Nuthatch, as well as key-factors essential for its conservation				Due to the small sample size and from only one breeding season, it is difficult to make a significant conclusion. However, this research indicates that mature pine plantation is the important nesting and foraging habitat for giant nuthatch.

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

a). Nest searching was carried out during the breeding season from February to May 2022. A total of almost 600 nest searching hours, we found seven active cavity nests (contained at least one egg) within 21 breeding home ranges. Out of seven active cavity nests there was only one that successfully fledged (with five fledglings). The estimated nest success of giant nuthatch based on seven active nest was 16%.

b). After choosing a suitable cavity, the floor was laid with nest material such as feathers, lichens, and mammal hairs. All active cavity nests were either in the natural holes such as cracks in the trunk of the living pine trees (*Pinus kesiya*) or broadleaved trees or cavities excavated by other animals (Figure1). The average nest height of giant nuthatch is around 5.7 m with a range from 2.3 – 9.8 m. The

entrance diameter was around 8 cm with a range from 6 – 11 cm, and cavity depth was around 23 cm with a range from 12 – 32 cm.

c). Because of the limitation of the length of the endoscope camera used for the checking nests, we were able to check the nest contents for only two cavities (Figure 2). Based on the seven active nests, the clutch size of giant nuthatch was around five eggs. Incubation period was 14 days and nesting stage (brooding) took around 27 days. The total nesting period for giant nuthatch was 44-45 days. During the breeding season in 2022 we observed 21 breeding pairs and found seven breeding pairs with at least two fledglings (one found during nesting stage until nestlings fledged and six found after nestling fledged). So, the apparent nestling success was around 33%.

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

Severe weather conditions (strong winds and heavy rains created obstacles such as fallen trees blocking the road) during data collection affected the activity and times, for the safety of researchers, we had to adjust the fieldwork schedule to favourable weather conditions.

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

Due to the COVID-19 pandemic, we were not able to spend much time with the local people. However, during the field survey, a few forest rangers were trained and worked with us. After finishing the fieldwork were given brief results and information about the status of giant nuthatch which is an endangered species in the area and understand more about the importance of conservation work.

5. Are there any plans to continue this work?

We are planning to continue the study to:

- Assess nesting success and identify the main characteristics of nesting habitat and cavity.
- Assess fledgling and adult survival.
- Develop contacts and collaborations with researchers from Myanmar and China to plan/develop a global scale assessment of the giant nuthatch population.

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

- We plan to share the results of our work through several national and international conferences.

- The final report of the project will be submitted to Department of National Parks, Wildlife and Plant Conservation (the organisation directly responsible for conservation and management of wildlife and habitats in Thailand) and local offices of each protected area studied including nearby local organisations in order to provide information for management and policy making.

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

Collecting quantitative baseline data on mature pine planation utilisation and nest site habitat selection of giant nuthatch. This data will be provided to and discussed with Department of National Parks, Wildlife and Plant Conservation (the organisation directly responsible for conservation and management of wildlife and habitats in Thailand) as to the habitat characteristics that likely promote giant nuthatch reproductive success.

A further larger project to monitor reproductive success (and over the medium-term, adult, and juvenile survival) at likely key sites.

Additionally, the extent of available habitat in China and Myanmar while potentially much larger than Thailand, remains almost entirely unquantified. Thus, we highly recommend further investigation of the habitat remaining for giant nuthatch in Myanmar and especially in China.

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?

No, we did not.

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

Daphawan Khamcha was the main researcher of the project. She was the project manager and field leader. She is responsible for data analysis, reports and publication.

Rongrong Angkaew contributed as field researcher and assist with writing-up publication.

Andrew J. Pierce contributed as field researcher and assist with writing-up publication.

George A. Gale contributed as project advisor. He helped conceptualized this project, oversaw work progress on and off the field and assist with writing-up publication.

10. Any other comments?

We would like to thank The Rufford Foundation for supporting this project, without which this work would not have been successful.

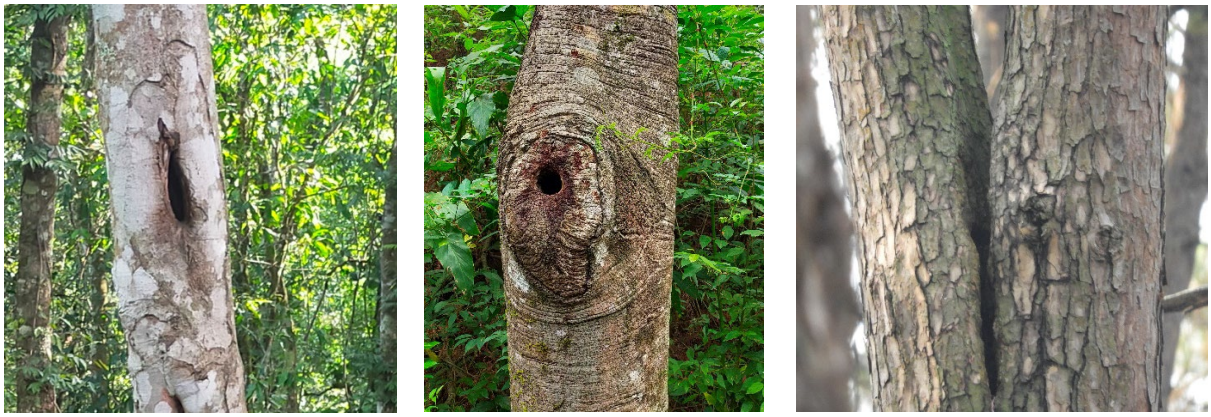

Figure 1: Nest cavities of Giant nuthatch in broad leaved trees (left & middle) and pine tree*, Pinus kesiya* (right)

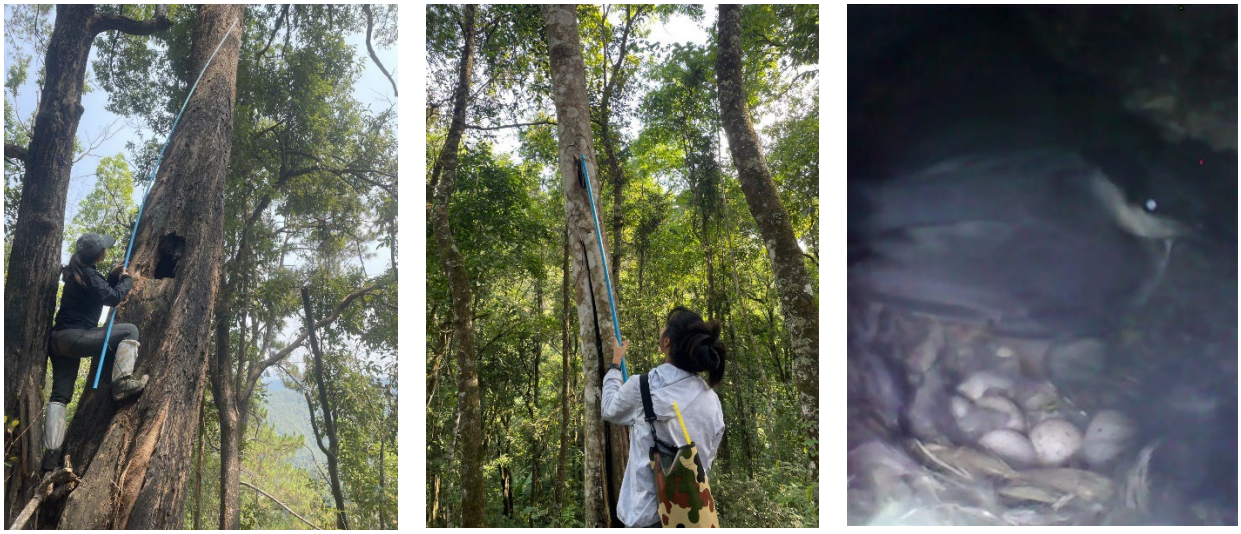

Figure 2: Researchers were using endoscope camera to check nest contents (left and middle). A female Giant nuthatch was incubating inside the cavity (Right).

Female Giant nuthatch. © Niti Sukumal

Male Giant nuthatch. © Myint Myint Soe

Fledgling of Giant nuthatch. © Myint Myint Soe