

EVIDENCE OF PILEATED GIBBONS *Hylobates pileatus* RECOLONIZATION IN AN AREA PROPOSED FOR WATER RESOURCE DEVELOPMENT IN KHAO SOI DAO WILDLIFE SANCTUARY, THAILAND

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ABSTRACT

During 2018 to 2019, at least one group of Pileated Gibbons *Hylobates pileatus* Gray was found in an area proposed for dam construction in Khao Soi Dao Wildlife Sanctuary. This finding suggests recolonization, following a community-based conservation project from 2009 to 2012. However, this recolonization would be jeopardised if the dam construction plan was approved.

Keywords: habitat destruction, *Hylobates pileatus*, Khao Soi Dao Wildlife Sanctuary, Khlong Ta Liu Dam, Pileated Gibbon, re-emergence threat

INTRODUCTION

The Endangered Pileated Gibbon, *Hylobates pileatus* Gray, is one of 20 species of small ape and is found in the remaining forest of central and eastern Thailand and in Cambodia west of the Mekong River (Roos et al., 2014). Like other gibbons Pileated Gibbons are vulnerable to hunting and habitat loss (Phoonjampa & Brockelman, 2008). Since 2008 we have been monitoring the population of Pileated Gibbons in the Ta-riu tributary, Khao Soi Dao Wildlife Sanctuary, Chanthaburi Province, Thailand using auditory surveys. While a community-based conservation project has resulted in the recolonization of once depleted areas (Kolasartsanee & Srikosamatara, 2014), the threat of habitat destruction has re-emerged at the Ta-riu tributary.

The Ta-riu tributary is one of the headwaters of the Chanthaburi River, located on the western side of Khao Soi Dao Wildlife Sanctuary (Fig. 1). The North Ta-riu Watershed is one of the watersheds of the Ta-riu tributary, which in 1979 was the study site for research focused on the ecology and behaviour of the Pileated Gibbon (Srikosamatara, 1984). Comparing with the population data in 1979 (SS, unpublished data), a re-survey in 2008 revealed a decrease in the Pileated Gibbon population (Kolasartsanee & Srikosamatara,

2014), attributed to the main threat from local hunting at that time (Kolasartsanee, 2014). By then the only remaining Pileated Gibbons occupied the mountains around the watershed, while the valley, which suffered high pressure from hunting, was vacated.

In response to this threat, a community-based conservation project employing the *Diffusion of Innovations* (Rogers, 2003) social theory and conservation marketing was initiated in 2009 to mitigate the hunting pressure on the Pileated Gibbon (see Kolasartsanee & Srikosamatara, 2014). This theory essentially investigates and describes the reasons and progression for the dissemination of new ideas and technology (Rogers, 2003). Adapting this, we carried out a series of meetings and activities to facilitate the desired change in behaviour of key individuals of the focal community towards the Pileated Gibbon, who then later expanded the acquired behavioural change into their community (Kolasartsanee & Srikosamatara, 2014). Although there was no direct evidence of a decrease in hunting pressure after these conservation interventions, an auditory survey in 2012 revealed reoccupation of the valley (Kolasartsanee & Srikosamatara, 2014). Since 2012, the valley of the North Ta-riu Watershed was believed to be the only recolonized area (Kolasartsanee, 2016).

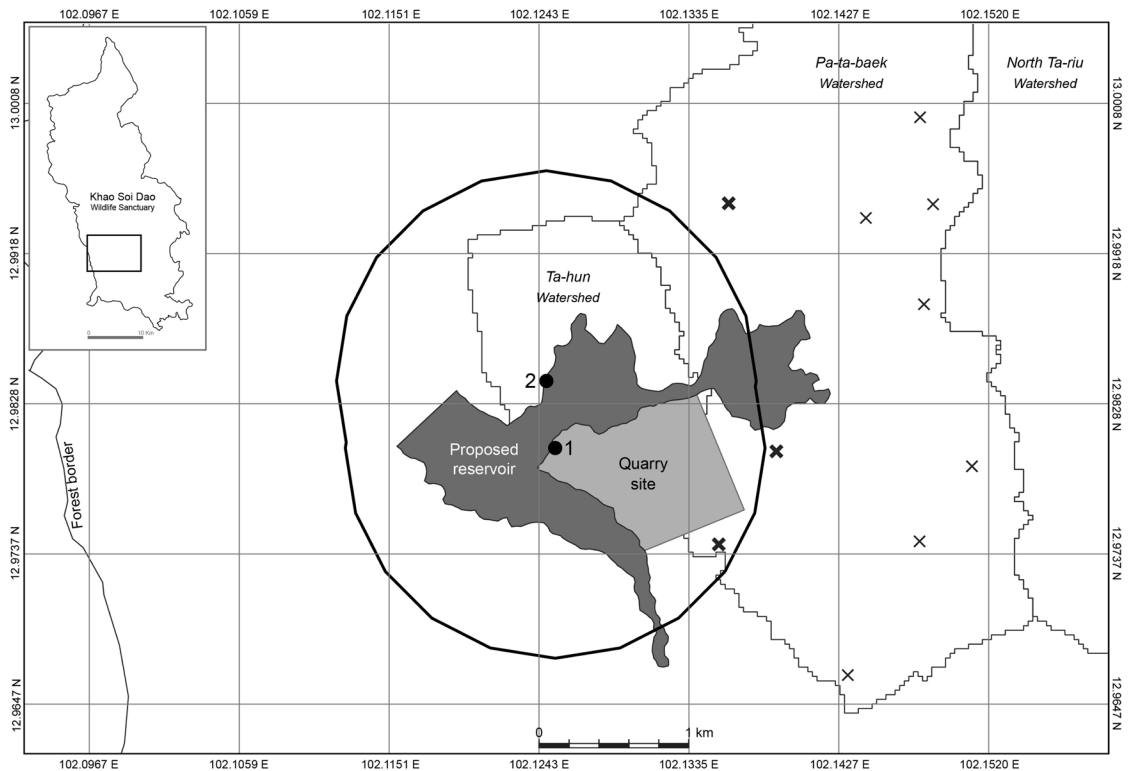


Fig. 1. Map of Ta-riu tributary with boundaries of three watersheds indicated in italics. The proposed Khlong Ta Liu Reservoir is shown in dark grey and the quarry site is shown in light grey (adapted from JICA, 1989). Locations of Pileated Gibbon observations described in the text are shown as black dots. The possible occupied area of the natal groups, based on a 1,400-metres radius from the two new locations, is shown in a thick black circle. Known Pileated Gibbon groups in Pa-ta-baek Watershed are shown as cross marks (Kolasartsanee & Srikosamatara, 2014; Kolasartsanee, 2016). Potential natal groups of the Pileated Gibbons found in locations 1 and 2 are shown as thick cross marks.

FINDINGS AND OBSERVATIONS

In 2018, a camera trap survey of terrestrial mammals at Ta-riu tributary was conducted. Five camera traps were set up from the forest border to the North Ta-riu Watershed. During camera trap maintenance, Pileated Gibbons were encountered twice at the Ta-hun Watershed, located about 3 km from the North Ta-riu Watershed; according to personal communication with local people and personal observations of I. Kolasartsanee since 2008, the Pileated Gibbons had not been found in this watershed for more than 10 years. The first finding was on 14 June 2018 when three consecutive duet calls were heard from Location 1 (Fig. 1). The second finding was on 20 April 2019 when two males with a female were directly observed by one of our local team and I. Kolasartsanee at Location 2 (Fig. 1). We interpret these observations as recolonization.

Using data on sub-adult dispersal in White-handed Gibbon *H. lar* (Linnaeus) studied at Khao Yai National Park, the longest natal dispersal distance of a sub-adult White-handed Gibbon was about 1,400 metres from the centre of its natal group (Brockelman et al., 1998). Thus, to estimate the possible occupied area of the natal groups of Pileated Gibbons found in these two locations, we used the buffer tool in the QGIS 3.4.10 program to buffer both locations with a 1,400-metre radius (Fig. 1). Auditory surveys at the North Ta-riu Watershed in 2008, 2012 and 2016 detected Pileated Gibbon groups at the Pa-ta-baek Watershed (Fig. 1) (Kolasartsanee & Srikosamatara, 2014; Kolasartsanee, 2016). The three groups on the west side of Pa-ta-baek Watershed could be the natal groups of Pileated Gibbons found in these two locations, as one group was located in and two groups near the

possible occupied area of the natal groups. Pileated Gibbons found in these two locations may be another recolonizing population beside the mountains and the valley of the North Ta-riu Watershed. The valley of the Ta-hun Watershed may currently be a recolonized area for a population that comes from mountains around the watershed and the west side of Pa-ta-baek Watershed. This phenomenon may indicate a lower level of hunting pressure in Ta-hun Watershed. However, this recolonizing area could be destroyed if a dam construction plan at Ta-riu tributary is approved.

Fruit orchards are a significant economic activity in Chanthaburi Province, but require sufficient irrigation to thrive. From the perspective of irrigation engineering, some water resource development projects were planned in the protected areas, but with a lack of concern for biodiversity issues. A feasibility study was undertaken on the agricultural water development project in 1989, and the Khlong Ta Liu Dam was recommended on the Ta-riu tributary (JICA, 1989). It should be noted that Ta Liu and Ta-riu refer to the same tributary and watershed; the Royal Irrigation Department of Thailand uses Ta Liu, whereas the Department of National Parks, Wildlife and Plant Conservation uses Ta-riu.

According to the plan, the rock-filled dam would be built using rocks from the tributary (Fig. 1). However, the dam construction plan proposed by the Royal Irrigation Department of Thailand was rejected at that time. In the 2000s, several floods occurred in Chanthaburi City, so a flood mitigation project was conducted to increase the rate of water drainage from Chanthaburi City out to the Gulf of Thailand by constructing the Bhakti Rambhai Canal at Chanthaburi City. This project has increased the rate of water drainage in Chanthaburi City to more than the average rate over the past 100 years. Although this project has effectively mitigated floods in Chanthaburi City, two dam construction plans in Khao Soi Dao Wildlife Sanctuary were proposed by the Royal Irrigation Department in 2017. One was the Khlong Ta Liu dam and another was on Ta-rong tributary, located about 10 km north of the Ta-riu tributary. The approximate volume of these two reservoirs would be 30 and 60 million m³, respectively. The purposes of these proposed dams were to increase the ability of flood mitigation in Chanthaburi City by controlling the head waters of the Chanthaburi River, water management for domestic use, and building water security for the production sector (Kateworachai, 2017). All of these purposes were stated under the strategic plan of Thailand's water resource management (2015-2026)

(PCWRM, 2015). Although the dam construction plans were rejected, they may be re-proposed, due especially to the increase in demand for water from intense economic development policies and population growth.

Although the high elevation and steep slope of Ta-riu tributary have helped prevent illegal encroachment, this tributary has suffered from local hunting pressure for more than 40 years (Srikosamatara, 1980). This limited the distribution of Pileated Gibbon to high mountains far from the forest edge, which are hard to access by local hunters. After the community-based conservation project from 2009 to 2012, the recolonization of Pileated Gibbons from the mountains to the valley of North Ta-riu Watershed occurred (Kolasartsanee & Srikosamatara, 2014). The recolonized population continued to persist in 2016 (Kolasartsanee, 2016). The Pileated Gibbon group found in this article is evidence of expanded recolonization which may reflect the decrease in hunting pressure at Ta-hun Watershed. Compared with Pa-ta-baek and North Ta-riu Watershed, Ta-hun Watershed is easier to access by hunters in terms of elevation, slope and distance from the forest edge. Thus, this recolonization was beyond our expectation. However, if the plan for developing the reservoir is approved these habitats are at high risk of loss and fragmentation, and potential for recolonization is reduced. Hence, for the synergy between biodiversity conservation and water resource management, we suggest alternatives be sought, such as developing the reservoir be outside the protected area or improve floodway management of the Chanthaburi River.

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