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Exploring the Use of GPS Telemetry to Track Translocated Asian Elephants in Peninsular Malaysia

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Introduction

In the 19th century, elephants were found throughout Peninsular Malaysia. In the past century, Malaysia has lost about 50% of its forest cover (Kawanishi *et al*. 2001) with large areas of tropical lowland forest having been converted to oil palm and rubber plantations. As a consequence, elephant numbers in Peninsular Malaysia have diminished to an estimated 800 to 1200 individuals that exist in small, scattered, isolated groups (Sukumar 1989; Kemf & Santiapillai 2000; WWF 2002). In response to a lack of viable habitat, elephants raid plantations creating millions of dollars of damage annually (Stüwe *et al*. 1998). In the 1950s and 60s, plantation owners shot crop-raiding elephants. In response to an alarming decrease in numbers, elephants were afforded full protection under the Protection of Wildlife Act (1972), and the Department of Wildlife and National Parks Malaysia (DWNP) was charged with helping landowners reduce crop damage caused by wildlife. In 1974 DWNP established the Elephant Management Unit and initiated a translocation program that moves elephants identified as repeat crop raiders from agricultural land to protected natural areas, the main site of release being Taman Negara National Park. As of May 2006, over 600 elephants had been moved by this program (Nasharuddin Othman, pers. comm.).

Translocation of problem elephants is used as a last resort when deterrents or mitigation agreements fail to resolve the conflict as it is a costly and labor-intensive undertaking, yet there are few data on post-release movements of translocated individuals, precluding any evaluation of the program.

A pilot study using ARGOS satellite collars to monitor the post-release movements of a male and female elephant translocated to Taman Negara National Park in the mid-1990s suggested that sex might influence post-release behaviors (Stüwe *et al*. 1998). During the study the male established a range of 343 km^2 around its release site, never leaving the park. This range size was similar to other documented home range estimates of between 34 and 800 km^2 (Stüwe *et al*. 1998). However, the female elephant moved over a range of 6804 km^2 spending the majority of her time outside of the park's borders. Stüwe *et al*. (1998) suggested that the large range of movement exhibited by this female might reflect an attempt by her to re-establish contact with her matriarchal herd from which she had been separated during the translocation process.

Objectives and methods

The objective of our 2006 project was to use Global Positioning Systems (GPS) satellite collars to monitor the post-release movements of six crop-raiding elephants released into Taman Negara to try to answer the following questions: What happens to elephants after they are translocated? Do males and females have different movement patterns post translocation? Do translocated elephants continue crop-raiding? Do elephants home back to, or show directional movement towards, their capture location? We also aimed to begin to correlate elephant movements with habitat type, and quantify the amount, if any, of damage done to crops by translocated elephants.

Figure 1. Test DataScout collar fitted to a trained elephant at Kuala Gandah Elephant Sanctuary.

All animal handling was done by the DWNP staff, specifically the Elephant Management Unit, as part of regularly scheduled translocations of crop-raiding elephants. As part of this established conservation program, they used protocols that had been in use for over a decade.

Results

DWNP required testing for safety of any units proposed to be placed into elephants in the wild. Special medications were requested by DWNP to meet weight requirements (less than 10 kg total weight) (Sabaan & Othman 2002). Africa Wildlife Tracking (AWT) was the first choice vendor for this project, however their collar weighed more. They stood by their product as in use at the time in Africa and would not alter their design to reduce its weight, as we required. DataScout SA (Pty) Ltd (South Africa) was about to release a new GPS unit that was similar to the AWT collar, and they were willing to alter the collar design thus reducing its weight by placing the battery on the bottom of the collar in place of a counterweight. A field test of the design of the GPS collar designed by DataScout was conducted in August 2006 on a captive, tame elephant at Kuala Gandah Elephant Sanctuary and the design was approved by DWNP for use in the wild (Fig. 1).

The first collar was placed on a subadult male with a neck circumference of 196 cm at his capture site near Jerantut, Pahang on December 20, 2006 (Fig. 2). The male was driven to Tasik Kenyir and taken by barge across the lake and released the following day (December 21, 2006) into the heart of Taman Negara National Park (Fig. 3). Unfortunately, the collar took one reading at the release site and subsequently failed.

By request, the manufacturer of the collars came to Malaysia for 10 days in mid-January and extensive testing was conducted on the remaining four GPS units. In addition, a replacement of the failed unit was provided. At the end of the 10 days, it was determined that all five remaining units were in proper working order.

On January 30, 2007, a second collar was placed on a female elephant with a neck circumference of 216 cm. The collar was fitted to the elephant at the jetty on Lake Kenyir, about halfway through the translocation journey. The elephant was released a few hours later into Taman Negara at the same release site as the other elephant collared by this project. This second collar also only took one reading and then failed.

Figure 2. Subadult male on truck ready for translocation just after collar was fitted.

Each of the remaining units were connected to the batteries and sized to fit a range of elephant neck circumferences. These collars were placed at a wildlife department ranger station in the town of Kuala Lompat in both open area and in forest canopy to be sure they were operating before placing them onto another elephant being released into the wild. While waiting in between elephant translocation episodes, three of the four remaining collars failed after only five weeks. At this time, we abandoned the use of DataScout brand collars. The remaining GPS units were dismantled and shipped back to DataScout.

We gained permission with the proper DWNP managers in meetings in April 2007 to utilize AWT as originally proposed. DWNP agreed that the design of the collars was such that the slight extra weight of the AWT collars would be acceptable to them after the current experience. However, due to financial constraints the project ended in May 2007 with no further collaring. Subsequent unpublished reports have also shown issues with the DataScout brand collars not functioning properly (Leggett 2009). At the time this article was submitted, no known articles have been published showing successful deployment of DataScout collars.

Figure 3. Male elephant with DataScout GPS satellite collar being loaded onto a truck.

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