

## A Decade of Zero Elephant Poaching in the Cardamom Rainforest Landscape, Cambodia

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### Introduction

Elephants are facing a global crisis with African elephant *Loxodonta africana* populations estimated to have declined by 111,000 individuals in the past decade largely as a result of poaching for the illegal wildlife trade (Thouless *et al.* 2016). Similarly the Asian elephant *Elephas maximus* is now restricted to a tiny portion of the species' historic range and, alongside human elephant conflict and habitat loss, poaching is the biggest threat to their survival and is a particular issue in mainland South East Asia (Ling *et al.* 2016). Given this insidious global threat to elephant persistence, and the trend in increasing elephant poaching particularly in Africa, identifying and replicating successful anti-poaching initiatives is critically important.

Asian elephants are patchily distributed across Cambodia's remaining forests but viable populations likely occur only in Monduliri province, eastern Cambodia (likely population ~300 individuals; Gray *et al.* 2014) and the Cardamom Rainforest Landscape (CRL) in the southwest. The CRL, part of the Indo-Burma biodiversity hotspot (Myers *et al.* 2000), is a ridge-to-reef conservation landscape comprising 18,000 km<sup>2</sup> of largely contiguous forest cover (Fig. 1). The landscape forms a Global 200 Ecoregion (Cardamom Mountains Rain Forests), a secondary Endemic Bird Area (i.e. an area containing at least one restricted-range endemic bird species), and was listed as a Level I Tiger Conservation Unit by Wikramanayake *et al.* (1998).

### Case study

The CRL was historically remote and one of tropical Asia's great rainforests supporting a complete megafauna including tiger *Panthera tigris*, gaur *Bos gaurus* and, in all likelihood, rhinoceros spp. *Dicerorhinus* / *Rhinoceros* alongside Asian elephants. The landscape's forbidding topography, combined with civil unrest throughout much of the 20<sup>th</sup> century, prevented extensive settlement or natural resource exploitation. However following the defeat of Democratic Kampuchea in 1979 the region became increasingly settled by migrants from lowland Cambodia, large areas were designated as logging concessions, and infrastructure and road development, which accelerated from the late 1990s, was initiated.

The wide availability of fire-arms and extremely limited rule of law, particularly regarding environmental management, created conditions for extensive wildlife trade and poaching for high-value wildlife products. Market surveys across Cambodia during the 1990s documented a cornucopia of threatened species openly for sale including live wild caught tigers and tiger skins, bones, and skulls together with elephant skin, hair, teeth, bones, and both carved and raw tusks (Martin & Phipps 1996; Sun 2000). In the CRL elephants were poached for both tusks and for meat. Settlers opening up the rainforest often viewed elephants as an easy target and a good communal meal (local resident pers. comm. to TNEG, 2016). The high level of poaching, combined with a lack of law enforcement, likely led to the extirpation of tiger and leopard

*Panthera pardus* from the CRL – a minimum of 29 tigers were poached from the landscape between 1999 and May 2005 (Weiler 2006) and there have been no subsequent records despite camera-trapping and surveys. During a similar period (2000 to 2004) at least 38 Asian elephants were poached, in the CRL (Weiler 2006). The detections of elephant poaching were obtained from community informant networks set up by the Cambodia Community Wildlife Ranger Program (Weiler 2006). Without strong law enforcement and protected area management interventions it was clear that elephants would also be lost from the landscape.

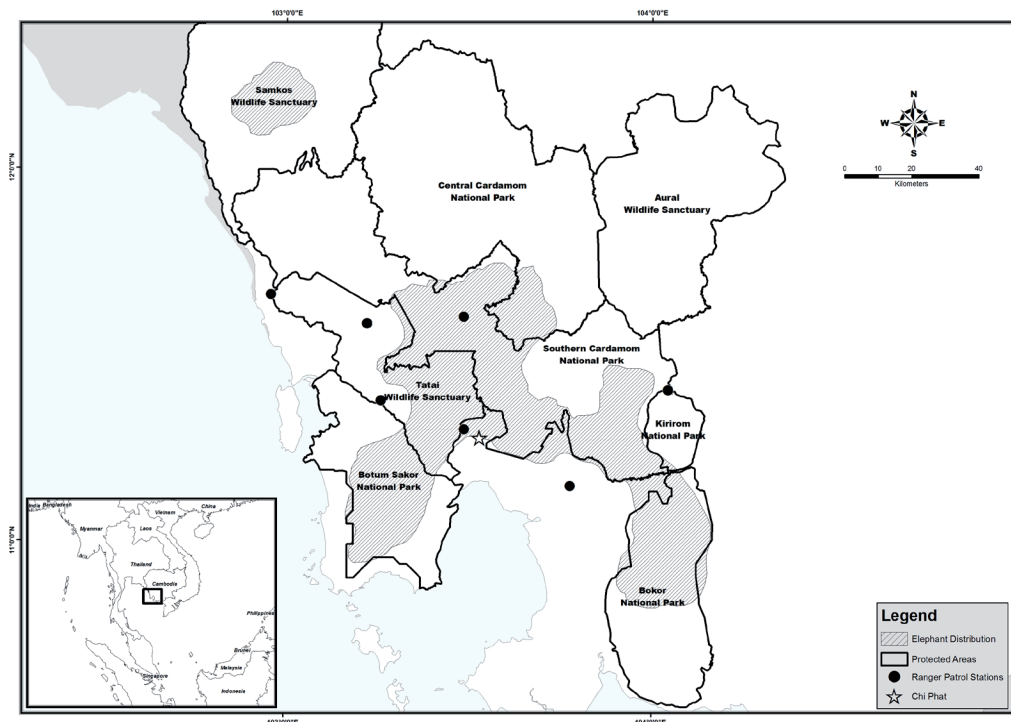
In response to this poaching crisis the conservation NGO, Wildlife Alliance <[www.wildlifealliance.org](http://www.wildlifealliance.org)>, which specializes in the direct protection of forests and wildlife, was invited by the Royal Government of Cambodia, in 2002, to support law enforcement across approximately 6000 km<sup>2</sup> of critical elephant habitat in the southern portion of the CRL (Fig. 1). A two-pronged conservation approach was initiated:

### 1. Protected area management and law enforcement

Following a strategic threat assessment, 7 ranger patrol stations were constructed at

critical locations within the landscape (Fig. 1) and staffed by multi-agency government law enforcement officers with both legislative and judicial authority. Until early 2016 the southern portion of the CRL was under the management of the Forestry Administration of the Cambodian Ministry of Agriculture Forestry and Fisheries (MAFF). Patrol teams were therefore comprised of Forestry Administration officers, with Judicial Police authority to enforce Cambodia’s Forestry and Wildlife Law, and Military Police Officers providing armed backup and the authority to apprehend government employees (e.g. police / army) involved in illegal activity. Between 12 and 14 (approximately 2-4 Forestry Administration and 10-12 Military Police) rangers, generally operating as two teams, were assigned to each patrol station. Individuals rotated annually between stations and each individual ranger shift was 3 weeks, based in the field at the patrol station, thus providing 24/7 operations. Each station was supported by a technical supervisor to provide overall management oversight and build the capacity and skills of law enforcement officers.

Standard operating protocols for law enforcement patrolling and case-management were developed and relationships built with provincial judiciary to ensure rapid and transparent management of infractions and prosecutions. Patrol operations



**Figure 1.** Protected areas, approximate elephant distribution and ranger patrol stations in the CRL.

and planning were largely threat-based using intelligence and information from informants and communities. Patrol efforts mainly focused on hotspots of illegal activity and strategic access routes into the forest. The majority of patrols were conducted on foot but motorbikes and speedboats were also used to allow rapid access to certain areas. Monthly helicopter aerial surveys were employed to detect land encroachment and habitat loss. Patrol and GPS-track logs were collected and managed using ArcGIS; there is a plan to transfer to SMART Conservation Software in 2017. As a result of this unstinting focus on effective and professional law enforcement patrolling, over 24,500 multi-agency law enforcement patrols have removed more than 180,000 snares and sent 370 offenders to court since 2006.

## 2. Community outreach

Interventions targeted communities of largely lowland Khmer settlers, known to be heavily engaged in the illegal wildlife trade most notably around Chi Phat commune; a hub of wildlife trade and elephant poaching (Weiler 2006). Whilst a number (<10) of other, largely ethnic minority, communities exist across the landscape Chi Phat was selected for targeted interventions as it was a known hunting hotspot and forests accessed by community members overlapped with extensive areas of Asian elephant home-range. Programs were developed to compensate for the opportunity costs of reducing illegal activity and unsustainable natural resource use most notably a highly successful Community Based Ecotourism project (CBET; <[www.chi-phat.org](http://www.chi-phat.org)>) which now generates more than US\$ 130,000 annually for community members (Reimer & Walter 2013). CBET infrastructure includes >200 km of forest trails, 20 homestays, 5 forest camp sites and a community run information centre, restaurant, and bar. More than 70% of the households in Chi Phat (total population 624 families; 2522 individuals) are CBET members and receive direct payments for providing services to tourists. A revenue sharing mechanism, designed by elected members of the CBET Management Committee, ensures an equitable distribution of services and benefits to the community.

As a direct result of such focused conservation effort no Asian elephant poaching has been detected in the landscape since 2006. We are confident this represents close to zero hunting mortality due to a) the extensive network of community level intelligence and informants which are likely to provide timely information and b) no elephant carcasses attributable to poaching have been detected during the extensive patrolling or other surveys in the landscape. Camera-trapping provides some evidence of a recovering population with multiple images of adults with calves (Fig. 2). Whilst population estimates and demographic data on the population have yet to be collated or analysed field data collection for a faecal DNA capture-mark-recapture study was conducted across the landscape during the 2015/2016 dry-season by Flora and Fauna International and a population estimate is expected by early 2017.

Formal protection of the entire landscape was confirmed in May 2016 when the Royal Government of Cambodia declared the Southern Cardamom National Park, formally various logging concessions, a new protected area (Souter *et al.* 2016). Consequently management of the landscape has moved from the Ministry of Agriculture Forestry and Fisheries to the Ministry of the Environment and most Forestry Administration law enforcement officers have transferred to the Ministry of the Environment.

## Discussion

Our experiences in the Cardamom Rainforest Landscape, Cambodia, demonstrate how, with focused law enforcement and direct protection of



**Figure 2.** Asian elephant camera-trap photo from Southern Cardamom National Park, Dec. 2014.

wildlife, elephant poaching crises can be averted and populations may start recovering. However success requires dedicated law enforcement capacity combined with supportive governments and engaged communities. Considerable conservation investment for on-the-ground law enforcement is also required. Law enforcement in the landscape costs approximately 200 US\$ per km<sup>2</sup> per year, which is similar to estimated costs for effective African elephant protection (Naidoo *et al.* 2016). It is therefore likely that such an extensive law enforcement model, and similar levels of funding, will be required in elephant poaching hot-spots globally (e.g. central and eastern Africa) if we are to save the planet's largest land mammal.

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