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**CHAPTER 15**

# STATUS OF TIGER, PREY AND HUMAN-TIGER CONFLICT IN THE NAM ET-PHOU LOUEY NATIONAL PROTECTED AREA, LAO PDR

By

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## ABSTRACT

Lao PDR still contains extensive habitat for tiger and their prey, although the abundance or distribution of these populations remains unknown and killing of tigers in response to human-carnivore conflict is largely unmanaged. We are monitoring the abundance and distribution of tiger, prey, and tiger-human conflict in the Nam Et -Phou Louey National Protected Area (NPA) on the Lao-Vietnam border. We use intensive camera-trap sampling to monitor large carnivores and prey and a standardized format to record incidents of large carnivore depredation of livestock in NPA villages. In the first year of monitoring, tiger density was estimated to be 0.7 individuals/100km$^2$. Relative abundance of large ungulates was low as compared to small prey. An average of two livestock were lost per village/year with most kills occurring in grasslands over 2 km from villages. Livestock grazing in remote pastures inside the NPA appears to be directly related to tiger poaching. Tiger poaching, followed by prey depletion, are factors having the greatest effect on tiger abundance in northern Lao PDR.

Key Words: Camera traps, human-tiger conflict, Lao PDR, monitoring, tigers.

## INTRODUCTION

Lao PDR is about twice the size of the country of Nepal with only 22 people/km$^2$and over 40% forest cover (ICEM 2003). Surveys in the 1990s identified four areas of the country with potentially viable tiger (*Panthera* tigris) populations (Duckworth *et al.* 1999). Our research in one of those areas, the Nam Et – Phou Louey (NEPL) National Protected Area (NPA), is the first systematic study of tiger and prey abundance and distribution in the country.

The NEPL NPA contains mixed evergreen deciduous forest and grasslands ranging from 400 to over 2,000 m in elevation (Davidson 1998). The protected area covers 420,000 ha with 98 villages inside and on the boundary of the protected area (Schlemmer 2002).

In 2002, the Wildlife Conservation Society (WCS) was invited by protected area authorities to help solve a long history of human-tiger conflict in the area that included reports of tiger attacks on large livestock belonging to villages in the area, and illegal trade of tiger and prey populations. The goal of our project is to conserve tiger and prey populations while resolving problems of human-tiger conflict. Our research is focused on monitoring the abundance and distribution of tiger and their prey, as well as the frequency and distribution of livestock depredation and poaching of tiger and their prey.

## METHODS

We conduct tiger and prey surveys using passive infrared camera traps (Karanth and Nichols 2002). Cameras are set in 100 $km^2$ sampling blocks in the interior and proposed extension areas of the protected area as far from villages as possible and near areas with previous reports of tiger sign or livestock attacks. Each sampling block is divided in 25 subunits, and a pair of cameras is placed in each subunit near active animal trails. Paired cameras are programmed to operate 24 hours per day and left in the forest for a minimum of 30 days.

We rate each photo as a dependent or independent event, with an "independent event" defined as 1) consecutive photos of different individuals of the same species; 2) consecutive photos of individuals of the same species taken more than 0.5 hours apart; or 3) nonconsecutive photos of individuals of the same species (O'Brien *et al.* 2003). For each species, we calculate the number of independent photos per 100 trap-days as an index of relative abundance.

To understand human-tiger conflict, we trained district response teams to systematically gather data on tiger depredation of livestock. The officers monitor all new reports of tiger depredation of livestock, using a standardized data form to record husbandry methods and details of livestock owned and killed. At the kill site, officers record information on habitat as well as evidence of the kill and the identity of the carnivore if possible.

## RESULTS

In the first year of monitoring (March 2003-May 2004), we conducted five camera-trap surveys (3,588 trap days). Cameras recorded over 1,300 photos of 45 species of wildlife including 32 mammals of which 20 were carnivores. We recorded 345 independent photos of small prey (weighing less than 100kg) including macaques (*Macaca arctoides*), muntjacs *(Muntiacus muntjac, M. rooseveltorum/truongsonesis)*, porcupines *(Hystrix brachyurus, Atherurus macrourus)* and hog badger *(Arctonyx collaris)* and 37 independent photos of large prey including pig *(Sus scrofa)*, serow *(Capricornis sumatraensis)*, sambar *(Rusa unicolor)* and gaur *(Bos frontalis)*. Large and small prey species were recorded from all sampling blocks, and mean relative abundance of each group did not vary significantly between the five blocks. Tigers were photographed from three sampling blocks. Applying closed population assumptions (Karanth *et al.* 2004), we calculated an average density of 0.7 tiger/100 $km^2$ across an effective sampling area of 952 $km^2$.

Survey teams recorded evidence of hunting in every block. Police reports of tiger poaching and results from the camera trap surveys indicated that human disturbance was significantly higher in some blocks. Given the evidence of tiger poaching and the consistency of prey abundance across blocks, the absence of detection of tiger in some areas of the NPA is more likely the result of poaching than the absence of prey.

Eleven percent of villages reported tiger attacks of livestock during the first year of monitoring with an average loss of two head per village, representing <2% of the herd held by these villages. Farmers reported that they release their cattle into forested areas to graze due to lack of forage and uses fences to keep them away from crops near the village. The majority of livestock reportedly killed by tiger were more than two km away from the village when attacked. Officers were unable to accurately verify the predator in most cases because of an average lag time of 60 days between the attack and the farmer's report to the district. Given the relatively low rate of livestock loss and a lucrative market for trade of tiger bones, few households in villages who lost livestock expressed interest in reporting fresh livestock kills to district officers. Instead, freshly-killed carcasses are often loaded with explosives in the hope of blowing up the tiger when it returns to the kill.

## CONCLUSIONS

Our first year of monitoring provided exciting evidence that the NEPL NPA contains an important tiger population for Indochina. Tigers are under threat from poaching for the bone trade, and to a lesser degree, from over harvest of prey. In response to these results, last year protected area authorities laid out a promising plan for tiger conservation, which included, i) marking core zones for tiger conservation and patrolling against hunting in these areas; ii) relocating livestock production to village areas; and 3) building local pride and incentives for tiger conservation. We are working with them to implement this plan and are hopeful that these are the first steps to establishing a national tiger conservation area in Lao PDR.

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