

# Effectiveness of a social marketing strategy, coupled with law enforcement, to conserve tigers and their prey in Nam Et Phou Louey National Protected Area, Lao People's Democratic Republic

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## SUMMARY

The Nam Et Phou Louey National Protected Area in the Lao People's Democratic Republic contains the last confirmed breeding population of tigers (*Panthera tigris*) in Indochina. There are two main threats to tigers, direct killing of tigers and the illegal hunting of wild ungulates, the tigers' principle prey. Villagers living around the National Protected Area rely on these same ungulates as an important source of protein in their daily diet. The illegal hunting of tigers and prey for commercial trade is unsustainable and is driven by a lack of ownership by local villagers who engage in illegal activities and by government agencies that do not enforce the laws. To reduce these threats the Nam Et Phou Louey National Protected Area is using a social marketing campaign in parallel with traditional enforcement to change the behavior of illegal hunters, village members, and government officials. To determine campaign effectiveness, a survey instrument was developed to measure knowledge, attitudes and behavior change, which included both a control and pre and post surveys of target audiences. The pre and post surveys indicate a significant shift along the theory of change from knowledge to behavior change. The assumption is that over time this shift will also lead to threat reduction to, and thus increase of, tiger and prey populations.

## BACKGROUND

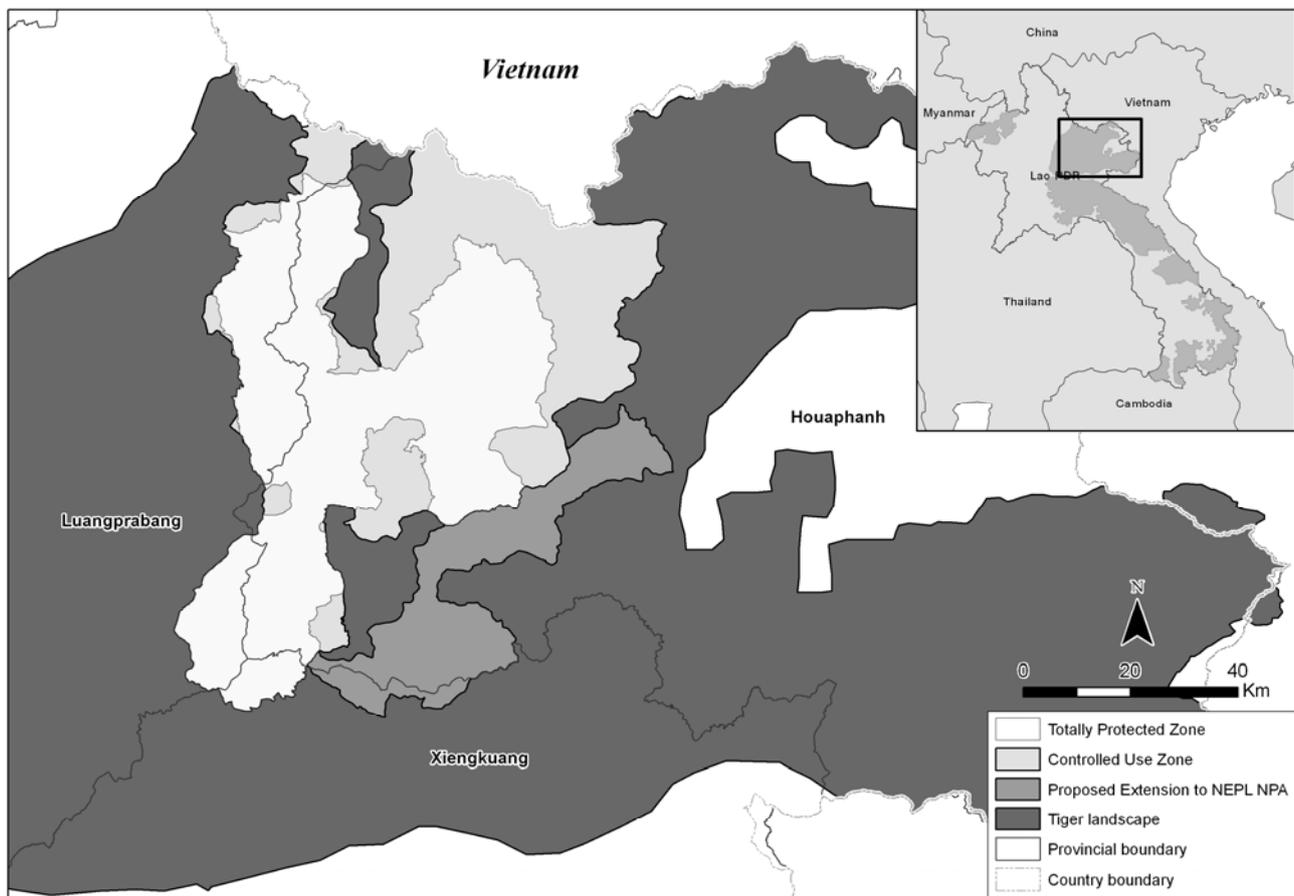
Indochinese tiger *Panthera tigris corbetti* populations in Southeast Asia are much reduced from their historical numbers and range (Rabinowitz 1999). There is now only one known population east of the Mekong River, which is in the 5,950 km<sup>2</sup> Nam Et Phou Louey National Protected Area in northern Lao People's Democratic Republic (Walston, Robinson et al. 2010) (Figure 1). The Tiger National Strategy and Action Plan identifies Nam Et Phou Louey as a key site to conserve tigers for Lao People's Democratic Republic and the rest of Indochina (GoL 2010).

Although Nam Et Phou Louey was established for maintaining viable populations of tigers and other critically important wildlife, the poaching of wildlife within the National Protected Area, which is driven by commercial trade networks, poses a significant threat to both tigers and their ungulate prey. Before active management of the National Protected Area began in 2000, villagers reported weekly commercial trade in wildlife products with Vietnamese traders (Davidson 1998). Gall bladders of gaur *Bos frontalis* and the antlers of the Sambar Deer *Cervus unicolor* were among the products commonly sold (Vongkhamheng 2002). Today, Sambar, Muntjac *Muntiacus spp.*, and Eurasian Wild Pig *Sus spp.* meat are still illegally traded from villages bordering the National Protected Area and transported by bus or truck for sale in urban restaurants and markets, 2 to 12 hours away. These threats escalated in 2011 when the government rebuilt and widened an old road, which increased access to a part of the Totally Protected Zone in the National Protected Area, that harbored breeding tigers and large ungulate populations (Johnson et al. 2012).

The consumption of ungulates for subsistence by local communities presents an additional barrier to tiger conservation (ICEM 2003, Johnson et al. 2006). Recent studies indicate that consumption of wild meat, especially by villagers in the Controlled Use Zone of the National Protected Area is as much as 50% of household meat consumption and will likely remain an essential component of human food security until livestock husbandry can be improved (Krahn & Johnson 2007, Johnson et al. 2010). The Controlled Use Zone is land in the National Protected Area adjoining the Totally Protected Zone where previously settled people may live and carry out livelihood activities in accordance with the management rules of the National Protected Area. The National Protected Area, Totally Protected Zone is a restricted area where animal and plant species may not be removed, unless local authorities and the Ministry of Agriculture & Forestry provide special permission (MAF 2001) (Figure 1). Other analyses show that tiger poaching is closely tied to village cattle grazing practices in the National Protected Area (Johnson et al. 2006, Lynam et al. 2006). The evidence indicates that villagers use semi-permanent settlements in grazing areas near and within the National Protected Area, Totally Protected Zone to opportunistically kill tigers with wire snares and metal leg hold traps, and also to hunt tigers' prey. In light of these findings, efforts to improve villagers' positive perception of tiger and prey conservation are needed.

In Nam Et Phou Louey, a baseline survey in 2003-2004 estimated that a minimum of seven and possibly as many as 23 tigers were present in the total effective sampled area of the Totally Protected Zone (Johnson et al. 2006). The goal for tigers and prey is to increase tiger abundance by a minimum of 50% by 2015 and to increase prey populations to levels sufficient to support the increased tiger population. To reach this goal, objectives are to: i) reduce killing of tigers and prey in the National Protected Area, ii) reduce the use of fire arms

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**Figure 1.** Map of the Nam Et Phou Louey National Protected Area and surrounding Tiger Conservation Landscape.

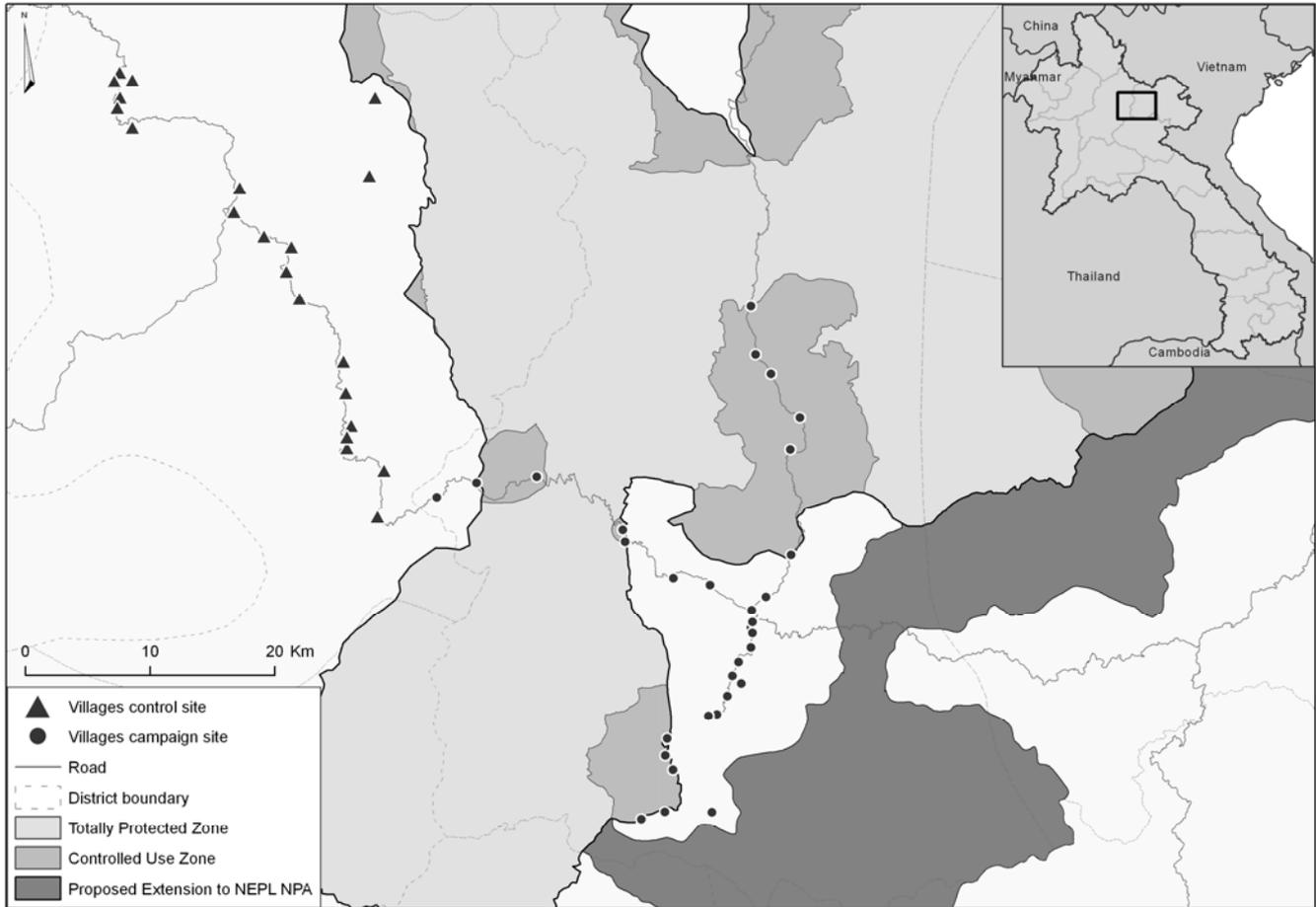
for killing tigers and prey, iii) stop hunting in the Totally Protected Zone and of protected species (including tigers and large prey) outside the Totally Protected Zone, and iv) to stop illegal trade of tiger prey from the National Protected Area (Johnson 2012). Two major strategies – wildlife law enforcement and conservation outreach – are currently being used to achieve these objectives. To assess progress towards these goals and the effectiveness of these strategies, National Protected Area teams monitor the status of tiger and prey populations and threats in the Totally Protected Zone and across the greater tiger landscape (Johnson *et al* 2012).

The Wildlife Conservation Society has worked with the Government of the Lao People's Democratic Republic in the Nam et Phou Louey on the Tiger Conservation Project (hereafter called "the project") since 2002. The project conducted conservation outreach activities from 2004-2009 in more than 100 villages in five districts around Nam et Phou Louey. The conservation activities and materials that were used were billboards, posters and village visits. The purpose of the project was to ensure that villagers in five of the seven districts bordering the National Protected Area, Totally Protected Zone became aware of the guidelines for natural resource use in the Controlled Use Zone. The National Protected Area conservation outreach team then worked with each village to negotiate the boundary between the Totally Protected Zone and their Controlled Use Zone. The National Protected Area staff created and posted 150 signs marking the Totally Protected Zone boundary to further inform villagers about the boundary location.

## ACTION

From April 2009 to August 2010, a social marketing campaign was designed and conducted in 36 target villages (treatment site) in Viengthong district, Houaphan province. Concurrently with the campaign, 21 villages in Viengkham district, Luang Prabang province were selected as a control site (Figure 2). The two sites were selected to have the same gender ratio, age group distribution, target audiences, religion, residence type, family size, geographic locality, and ethnicities. The National Protected Area management has applied law enforcement and conservation outreach activities at both sites. Both have National Protected Area guard posts with constant foot patrol effort in the Totally Protected Zone adjacent to the villages.

A Rare pride "campaign" is a program that uses social marketing (Andreasen 1994) methods to motivate change in human behavior to achieve biodiversity conservation results, especially, in developing countries (Jenks, Vaughan *et al.* 2010). The Nam et Phou Louey campaign developed a Theory of Change following the Rare pride program framework to illustrate the desired outcomes of the campaign (Table 1). A "Theory of Change" is defined as "a systematic and cumulative study of the links between activities, outcomes, and contexts of the initiative" (Connell & Kubisch 1998). This paper presents the monitoring results of the first five stages of the Theory of Change. The project anticipates that it will take more time to observe and evaluate change in the final two stages, Threat Reduction and Conservation Results.



**Figure 2.** Map showing the location of the 36 villages in Viengthong District where the social marketing campaign was implemented (treatment site) and 21 villages in Viengkham District (control site), bordering the Nam Et Phou Louey National Protected Area, Lao People’s Democratic Republic.

**Table 1.** Theory of change of Nam et Phou Louey social marketing campaign

<b>K</b>	+	<b>A</b>	+	<b>IC</b>	+	<b>B</b>	→	<b>B</b>	→	<b>T</b>	→	<b>C</b>
<p>Hunters and villagers increase their knowledge of hunting regulations and the importance of following them for food security in the local villages.</p> <p>Hunters, villagers and government officers become aware of the penalties and risks of breaking wildlife regulations.</p> <p>Hunters, villagers and government officers know the benefits of following wildlife regulations and benefits of reporting people who break the regulations.</p>		<p>Hunters and villagers feel greater ownership over their natural resources and agree that the hunting regulations are important for ensuring local food security. In particular they agree that hunting for trade is wrong as it robs the local community of their food.</p> <p>Government officers agree that all forms of illegal hunting and trade are a serious offence and they should be part of the solution rather than the problem.</p>		<p>Hunters and villagers talk to each other about benefits of following regulations for food security and the need and rewards of reporting poachers.</p> <p>Hunters talk about hunting regulations and penalties and risks of getting caught.</p> <p>Government officers talk about following and enforcing wildlife crime regulations.</p>		<p>Villagers in each community will put pressure on hunters who hunt illegally (using modern weapons and equipment in village use area and National Protected Area core zone and/or hunting for trade) to stop.</p> <p>Government officers endorsed by the District Governor will improve the enforcement system with regards to wildlife trade through closer collaboration, better role division and enforcement procedures.</p>		<p>Hunters will only hunt legally (hunt muntjac and wild pig in village use area using traditional equipment for food) and will stop hunting in the core zone, with modern equipment, for trade, and in other people’s village use areas)</p> <p>Villagers, hunters and government officers report all illegal hunting to WCU.</p> <p>Government officers will follow and enforce the wildlife regulations</p>		<p>Illegal hunting (hunting with modern equipment, in the core zone, in other communities’ village use areas or for trade, and hunting illegal species) of tiger prey species is reduced or eliminated</p>		<p>Tiger prey (Guar, Sambar Deer, Serow, Muntjac and Wild Pig) population increase allowing tiger populations to increase.</p>

### Social marketing campaign design and implementation

A conceptual model (Margoluis *et al.* 2009) was used to design the Nam et Phou Louey social marketing campaign in April 2009 during a meeting with 31 stakeholders from different sectors of government, NGO and village representatives. The stakeholders provided ideas and experiences to validate and adapt existing conceptual models originally developed by the project in 2007 (Johnson & Saypanya 2007). Discussion and small group work were used to identify the direct causes and indirect threats of ungulate decline, which includes Guar, Sambar Deer, Serow *Capreolus milneedwardsii*, Muntjac and Eurasian Wild Pig.

In May 2009, another stakeholder meeting was held with forestry section, village headmen, village elders, biologists and conservationists (national and international). Participants ranked threats to tigers and their prey, resulting in a prioritized list of human induced threats. Illegal hunting in the Controlled Use Zone and the National Protected Area Totally Protected Zone was identified as the *highest* ranked threat to be

addressed in the social marketing campaign. The threat ranking resulted in the selection of two interventions that were expected to be more effective than others and included, i) implement a social marketing campaign and, ii) increase the effectiveness of law enforcement to mitigate illegal hunting and wildlife trade, while promoting public participation in reporting wildlife crime through a telephone hotline. In addition, the conceptual modeling meeting revealed that the major barrier for public participation was a lack of options for reporting illegal actions. Thus, the idea of wildlife crime hotline was introduced to gain public support for reporting illegal hunting and wildlife trade. The Pride campaign was proposed as the tool to promote public reporting to the hotline.

The results of the two stakeholder meetings and pre-survey identified three important audiences who influence the threat of illegal hunting: illegal hunters, villagers and government officers. Illegal Hunters were identified as those villagers who were believed to have the potential to be illegal hunters because the government issues them guns to provide village

**Table 2.** Materials and activities used in the Nam et Phou Louey social marketing campaign

Materials	Connection between campaign materials and activities with key messages on behavior change.
Awning	Placed in fantastic location and very visible. Message reminds the Government Officers to enforcement the laws strictly.
Billboard	
Poster	Visually strongly and relates directly to the action to reinforces the slogan and very applicable to the target audience – people identify with it
Sticker	Direct action. The stickers will be mobile materials, because they will be put on motorbikes and cars so they will be travel every the vehicles go, this can affect more audiences.
Pledge for conservation certificate	The pledge will be notification of the target audience to remember what they have pledge in front of the Muntjac mascot before they go to hunt every time.
Notebook	2,500 note books targets government officers and illegal hunters. Presents all support points.
Campaign album	1,000 campaign albums were distributed to all audiences where electricity is accessible. Knowledge of threats and direct actions for audiences.
Storybook	5,000 storybooks were provided to every household to target villagers and illegal hunters.
Mascot	Muntjac mascot was the campaign ambassador. Links the mascot to all of the campaign materials
T-shirt, bags and jackets	The t-shirts, bags and jackets are mobile materials, because they will worn by people so they will be travel every the people who wear them go, this can affect more audiences.
Activities	
Village visit (Puppet show, Hunting game)	Puppet show was performed before storybooks were given to audiences. The storyline of the puppet show is the same of the storybooks. This visual game was applied to get participation from villagers and hunters so they know legality of hunting.
Concert	Famous pop stars of the campaign album performed at the concert in from of approximately, 3,000 people.
Illegal hunting workshop 1 & 2	These interactive workshops aimed to provide direct contact with illegal hunters.
Government workshop	These workshops were held at the center of the district.
Leaders workshop	
Spot on public address system	5 radio spots were displayed through public address system every evening.

**Table 3.** Example of questions that the villager audience was asked to measure change in each stage of the Theory of Change in the Nam et Phou Louey social marketing campaign

Stage of Theory of Change	Examples of questions included in the survey instrument
Knowledge	“Why do you think ungulates (muntjac and wild board) are important to you?”
Attitude	“I am going to read you a series of statements and I would like you to tell me whether you "strongly agree, agree, neutral, disagree or strongly disagree" with each statement.” “Outsiders who come to hunt in your Controlled Use Zone should not be punished.”
Interpersonal Communication	“In the past 6 months, have you talked to anyone about how to increase Muntjac and wild pig populations in your Controlled Use Zone? If you have, please tell me all of the people with whom you have talked to about this”
Barrier Removal	“In the past 6 months, have you heard of anyone receiving a fine for illegal hunting and wildlife trade?”
Behavior Change	“In the past 6 months, have you reported someone who was hunting for trade?”

Social Marketing campaign	Knowledge	Attitude	Interpersonal Communication	Barrier Removal	Behavior Change	Threat Reduction	Conservation Result
ToC	General villagers are aware that reporting illegal hunting & trade is their responsibility and they will get benefits from reporting	General villagers agree to report illegal hunting and wildlife trade	Villagers talk to one another and illegal hunters about illegal hunting and wildlife trade, and the benefits they get from reporting illegal activities	If general villagers allow illegal hunters keep practicing they will lose opportunity to consume wildlife	Report illegal hunting (hunting for trade, in the core zone, using modern equipment/weapons)	Reduce illegal hunting for trade with modern equipment	Increase ungulates (Muntjac and wild pig)
SMART objective	By the end of August 2010, % of villagers who respond that muntjac and wild pig are important food for people will increase to 20.5%	By the end of August 2010, % of villagers who say, "Not agree" that outsiders who hunt in their village use area should not be punished will increase to 20.5%	By the end of August 2010, % of villagers who have talked about how to increase muntjac and wild pig population in their village use area will increase to 49.9%	By the end of August 2010, % of villagers who have heard of anyone receiving a fine for illegal hunting will increase to 69.1%	By the end of August 2010, % of villagers who have reported someone illegally hunt for trade will increase to 15%		
Result	Pre-survey-Post-survey Treatment: 8.3%-51.7% Control: 9.0%-44.3%	Pre-survey-Post-survey Treatment: 42.4%-87.9% Control: 89.1%-87.0%	Pre-survey-Post-survey Treatment: 37.2%-57.3% Control: 38.9%-44.3%	Pre-survey-Post-survey Treatment: 44.9-68.8% Control: 38.7%-33.9%	Pre-survey-Post-survey Treatment: 4.8-9.3% Control: 7.0%-4.7%		

**Figure 3.** Results chain illustrating Nam et Phou Louey project assumptions about how social market campaign activities will result in changes in knowledge, attitudes and interpersonal communication of villagers, one of the campaign target audiences, which would in turn lead to behavior change and threat reduction such that conservation results are achieved. On the bottom, pre and post survey results showing observed changes in knowledge, attitude, interpersonal communication, barrier removal (reporting to hotline) and behavior of villagers in the campaign (treatment) and control sites.

security but they may instead use the guns to illegally hunt. Villagers are all villagers and include legal hunters. Government Officers are identified as authorities that influence the enforcement of the legislation governing illegal hunting and trade, which includes government officers who may influence the legal process including police, military, National Protected Area, financial, agriculture and forestry, judiciary officials (Table 3). In this paper we specifically focus and present the results from campaign impacts on only the Villager group.

The Theory of Change was broken down into a results chain for each audience (see Figure 3). The results chain is based on the assumption that before adopting a new behavior a person moves through a series of stages (Vaughan & Rogers 2000), which include pre- contemplation, contemplation, preparation, validation, action, and maintenance. The results chain is therefore a framework to outline the results that need to occur to move the campaign audience through the different stages of behavior in order to achieve the desired behavior change. The assumption is that once the audience has gained the necessary knowledge in relation to the desired behavior change, the audience has also gained a favorable attitude towards the idea of adopting the desired behavior, has been able to talk about the pros and cons of adopting the behavior to others, and will be ready to adopt the new behavior. The Theory of Change and results chain further identify any barriers that must be overcome for the audience to be able to adopt the desired behavior that could be either emotional or physical barriers to behavior change. The Theory of Change further spells out the assumptions made in terms of what threat reduction is assumed to occur once the behavior change is adopted and the conservation result the campaign aims to achieve. Since not all individuals in a target audience will be at the same stage of behavior, activities and messages need to

reach all groups in all different stages of behavior change. Results chains for each audience were used to create objectives that were *specific, measurable, achievable, realistic and time-bound* (Margolius and Salafsky 1998) for each target audience and helped inform the questions of the survey prior to audience collection.

The Muntjac was chosen as the flagship species (Clucas *et al.* 2008) because it can be legally eaten and does not threaten livestock and crops as tiger and other ungulates do. A logo with the image of the Muntjac was designed, tested and selected by members of the campaign audiences. Several slogans were created, tested and selected by the same group. The final slogan was "*Hunt for eating – Not extirpation*". This slogan/logo combination was designed to support the legal hunters to continue adhering to legal practices, while targeting the illegal hunters to shift from illegally practices to legal hunting.

The specific messaging for each audience was created. It was envisioned that the campaign would build pride in the legal hunters and villagers to put peer pressure on the illegal hunters, while creating an avenue for them to report to appropriate government officers (Figure 3). Similarly it was assumed that the messaging would encourage government officials to respond to illegal hunting as reported by the villagers. To do this, several key messages were brainstormed from various group discussions, deriving key messages for illegal hunters, villagers, and government officers. These messages were taken to the respective audience for discussion, confirmation and prioritization. The key message selected for each target audience were; i) Illegal Hunter: "*Use the right tools to hunt managed species in Controlled Use Zone, out of mating season, for personal consumption only*", ii) Villagers: "*The wildlife food of the villagers is declining – I will report every time I see illegal hunting and wildlife trade*" and iii)

Government officers: “I will follow up on all hunting and wildlife trade criminal cases, because I am a dedicated government official who does not buy or sell wildlife.”

Throughout the campaign timeline, village visits, printed media materials, media activities, workshops, events, and meetings were produced, implemented and used as the channels to deliver the campaign slogan and key messages to target audiences (Table 2). The campaign utilized many different and diverse types of activities and materials to deliver the slogan and key messages to the appropriate target audiences and we reinforced them through multiple channels to ensure target audiences retained the campaign and to maintain the momentum of the campaign fever by continuing to engage audiences with different campaign materials and activities, while removing any possible barrier from the target audiences.

#### **Barrier Removal - Wildlife Crime Unit and Hotline Design and Implementation**

The Pride campaign sought to promote reporting of illegal hunting and wildlife trade, while encouraging government officials to respond to the cases reported. To do so, it was determined that the existing National Protected Area Wildlife Crime Unit that was created in 2007 needed to be revived and a mechanism created to better facilitate the reporting of illegal activities to the Nam et Phou Louey enforcement unit. Lessons learned from the initial years of Wildlife Crime Unit implementation indicated that villagers often found it very difficult to communicate with the Wildlife Crime Unit, and even with successful communication the Wildlife Crime Unit often ignored the reports due to the lack of a point person responsible for the mobilizing the enforcement efforts. During the conceptual model and results chains activities, it was recognized that a weak local enforcement unit would act as a barrier to an effective outreach campaign achieving the desired conservation results. Therefore the outreach team felt compelled to assist the Nam et Phou Louey and the Wildlife Crime Unit in redefining the Wildlife Crime Unit mandate, assigning roles and responsibilities to increase effectiveness. The revised Wildlife Crime Unit consisted of the heads of district agencies such as Agriculture and Forestry, Commerce, Financial, Police and representatives from the Nam et Phou Louey Management Unit.

The creation of a hotline to facilitate the reporting of illegal hunting and trading acted as the catalyst between the Nam Et Phou Louey enforcement and outreach efforts. The campaign promoted the hotline and Wildlife Crime Unit by branding all campaign materials and activities with the hotline number. The campaign further promoted the Wildlife Crime Unit activities by conducting press releases about each case of illegal hunting and wildlife trade. A threat of a press release became a strong tool to encourage perpetrators to pay fines.

Press releases of wildlife crime cases were publicized through loudspeakers via the public address system in the district town.

#### **Monitoring the effectiveness and impacts of the social marketing campaign and the wildlife crime unit.**

To evaluate whether audiences in the campaign and control site had been exposed to campaign materials and activities, audiences were asked to report if they had seen and/or received campaign materials or attended events. The campaign evaluated the effectiveness of the campaign methods by assessing change in the first five stages of the Theory of Change (Figure 3) (Kleiman et al. 2000 & Vaughan et al. 2003) using a survey instrument that included questions to measure the change in *knowledge* (13 questions), in *attitude* (33 questions), in *interpersonal communication* (four questions), in *barrier removal* (six questions), and in the *change in behavior* (11 questions). In this paper we report on results from only one target audience “Villagers”. However all questionnaires, supplemental materials, and references can be obtained from <http://www.rareplanet.org/en/resource/pre-and-post-campaign-questionnaires?type=campaign> and examples of questions are shown in Table 3.

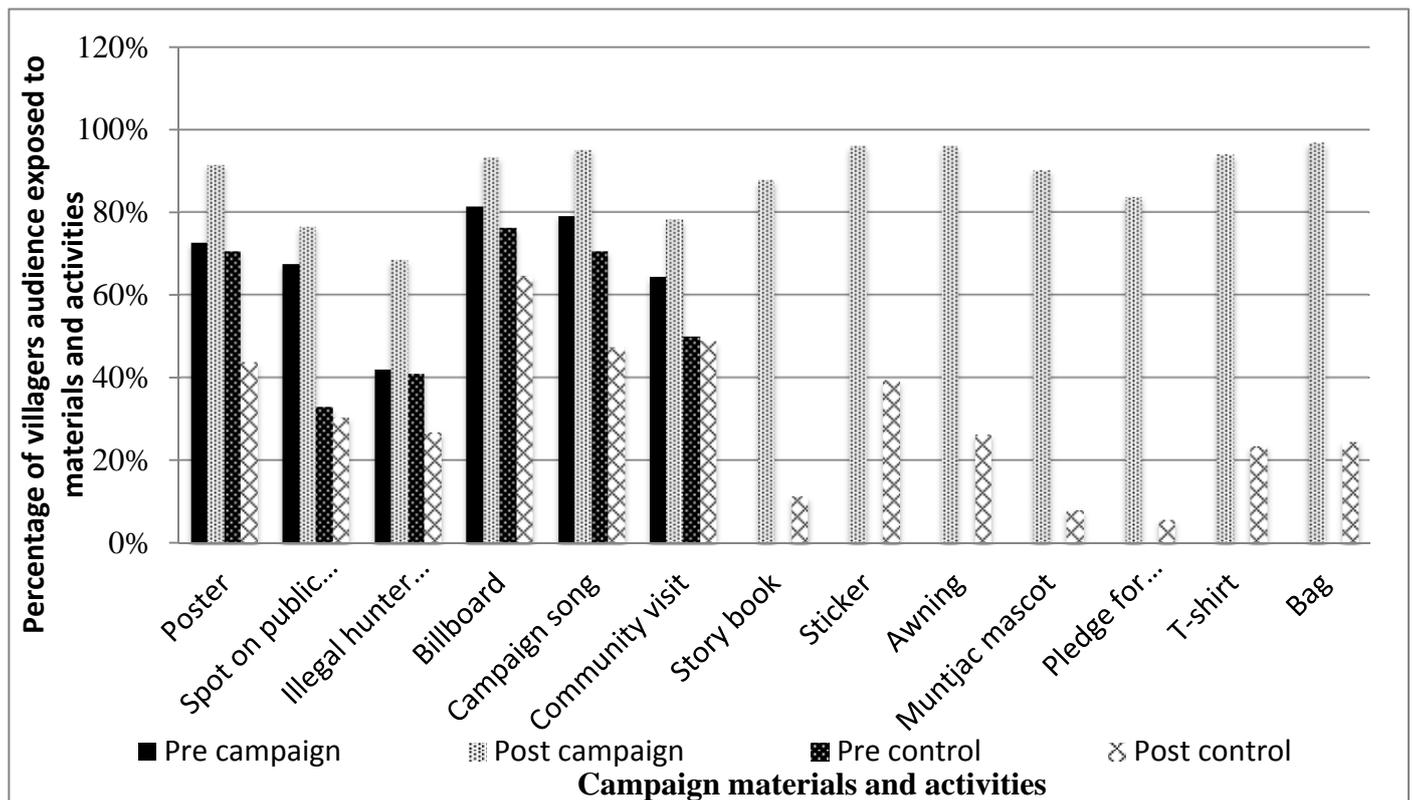
Pre-campaign surveys were conducted with a total of 615 people representing the Hmong, Khamu and Lao Loum ethnic groups in the campaign site and 570 people in the control site who met the same criteria. The representation of each ethnicity was based on the percentage of the total population. Pre and post surveys for both sites were implemented in the same locations with the same sample size. Anyone over 15 years old was randomly interviewed, and the same number of women as men. Village militia and police were surveyed in each village as potential illegal hunters.

Surveys were administered from July 13 – 21, 2009 (campaign site) and July 24 – 30, 2009 (control site) by ten enumerators, of which eight were national WCS staff and two were national volunteers, all of whom were trained before conducting the pre surveys. Fourteen months later, 13 enumerators, of which seven were new WCS national staff, one volunteer and five WCS conservation outreach staff from the previous year conducted the post surveys from September 19 – 24, 2010 (campaign site) and from September 28 – October 6, 2010 (control site). Responses of audiences from the pre and post campaign surveys were evaluated for significant change (Chi-square 95% or above).

Prior to implementing the Wildlife Crime Hotline an Excel database was created and used to track patrolling activities, responses to reports, cases closed and prosecutions. The coordinator of the hotline and Wildlife Crime Unit also created a logbook for the hotline. The logbook included incoming telephone number, time, date, length of call, type of report and responses to the hotline. The hotline coordinator entered data

**Table 4.** Statistical analysis on exposure to campaign materials, events and activities

Exposure	Chi squared		Degrees of freedom		P-value	
	Treatment	Control	Treatment	Control	Treatment	Control
<b>Billboard</b>	37.0050	2.4220	1.00	1.00	0.0001	0.1196
<b>Poster</b>	65.5240	21.2880	1.00	1.00	0.0001	0.0001
<b>Spot on public address system</b>	58.2290	9.8690	1.00	1.00	0.0001	0.0001
<b>Campaign song</b>	58.1620	6.3410	1.00	1.00	0.0001	0.0118
<b>Community visit</b>	33.7500	3.0420	1.00	1.00	0.0001	0.0812
<b>Participate illegal hunter workshop</b>	67.1900	3.8560	1.00	1.00	0.0001	0.0496



**Figure 4.** The reported exposure of Villager audience to campaign activities and materials in campaign and control sites before and after (pre and post) implementation of the campaign.

into both the logbook and the monitoring Excel database and created reports to Nam et Phou Louey Management Unit.

## CONSEQUENCES

Pre and post survey results were used to compare the exposure of the Villager audiences to Pride campaign materials and activities at the campaign and control sites (Figure 4). There was a significant increase in villager exposure to the poster, the public address system spot, and the illegal hunting workshop (Table 4).

Some materials and activities including billboards, the campaign song and the village visit had a high percentage of exposure in both the campaign and control sites. This is likely because the Villager audience had been exposed to these same types of materials and activities when they were used by the National Protected Area outreach team from 2004-2009 prior to the campaign. It is also possible that audience were confused between the campaign song and other wildlife songs broadcast by the Lao National Radio station through a different WCS project, the “Friends of Wildlife” program. A 2005 impact assessment of the radio program (Saypanya *et al.* 2005) showed that 40% of the population in the control and campaign sites listened to the radio and that the Friends of Wildlife program was ranked fourth highest out of 14 programs that people reported listening to.

The quantitative survey results (Figure 3) from a subset of questions asked to the villager audience (Table 3) indicate that the campaign was effective in significantly increasing the knowledge, attitude, interpersonal communication of the villager audience at the campaign site, which in turn led to significant change in both barrier removal and behavior of the campaign audience.

*Knowledge:* The proportion of the village audience that exhibited knowledge about the importance of ungulates as food increased significantly in both the campaign and control sites (Table 5). The increase at both locations may be the consequence of the National Protected Area doing similar outreach activities from 2004-2009 in both the campaign and control sites. In addition, villagers in these two sites are in frequent communication so it is possible that the knowledge of villagers in the control site was also influenced by the change in knowledge at the campaign site.

*Attitude:* There was a significant increase in the proportion of the village audience at the campaign site indicating that illegal hunting and trade should be punished, which was likely influenced by more people being knowledgeable about the importance of ungulates as a food source. In contrast, in the control site the proportion of the villager audience exhibiting an attitude that illegal activities should be punished was high in both the pre and post survey and did not significantly increase (Table 5). Even though similar outreach activities were done in both sites prior to the campaign, these activities were not as intensive and did not seem to have the same lasting effect in the campaign site as they appear to have had in the control site. We think this may be because the district in the control site has always been more supportive of the National Protected Area regulations than the district in the campaign site. Thus, the campaign site may have required an intensive campaign effort to see significant change in attitude.

*Interpersonal Communication:* There was a significant increase in reports of interpersonal communication among the villager audience in the campaign site about how to increase ungulate populations by reducing illegal hunting post survey but not in the control site (Table 5). This suggests that the

exposure to the campaign materials and events (e.g., the Public Announcement system spots), along with changes in knowledge and attitude did lead to more communication in the campaign site. In the control site, even though a relatively large proportion of the villager audience were knowledgeable and felt that illegal activities should be punished, interpersonal communication did not change because exposure to campaign materials and events was low.

**Barrier removal:** There was a significant increase at the campaign site in the percentage of the villager audience that reported hearing of someone receiving a fine for illegal hunting and trade, but not in the control site where there was little change (Table 5). This suggests that reporting and enforcement to restrict illegal hunting and trade had increased in the campaign site relative to the control site.

**Behavior Change:** The number of villagers responding that they had reported someone for illegally hunting for trade increased significantly in the campaign site as compared to the control site where there was no significant increase in reporting (Table 5). These results provide strong evidence that the campaign was effective in ultimately changing behavior of villagers in the campaign site to take action against illegal hunting and trade. Even though, we initially observed that knowledge and attitude towards illegal hunting and trade in the control site was generally positive, the absence of the campaign events and materials, and the Wildlife Crime Unit hotline did not result in significant behavior change in the control site.

There are also qualitative indications that the campaign was effective in changing the behavior of villagers. In one case, a village hunter that was arrested and fined by Wildlife Crime Unit felt that he was innocent so he appealed to the Wildlife Crime Unit that he had been wrongly accused of hunting illegally. In making his case, he confidently explained that he had used a legal weapon, a machete to kill a hog badger *Arctonyx collaris*, a legal species to hunt, in his own village use zone and for his family's consumption, not for trade. The authorities responded that while he had complied with most of the laws he broke only one rule, which was hunting during a closed season. This example illustrates how village hunters had changed as a result of the social marketing campaign messaging. Even though the hunter had broken one of the hunting regulations he was confident to appeal because he felt he had followed the principles of legal hunting promoted by the campaign.

We also found anecdotal evidence of the campaign's effectiveness in the interpersonal communication between the campaign audience and people from outside the campaign area that had not been exposed to campaign materials and activities.

These outsiders criticized the campaign slogan saying that it encouraged more hunting whereas those that had been exposed to the campaign materials and activities understood the principles of sustainable hunting practices that were represented in the slogan.

The outreach team also interviewed one hunter and one general villager to get their feedback on the campaign. The hunter used to hunt and trade illegally, but because of the campaign had stopped. He told the Wildlife Crime Unit on the identity of key perpetrators, how they move around the district, and reported illegal activities that led to multiple arrests. He said he thought the campaign was targeted at the correct audiences and appreciated the campaign organizer's contact time with the communities. He felt the hotline number was a very effective way to report illegal activities and said, "If we continue reporting this way the wild animals in the Nam et Phou Louey National Protected Area will increase." The general villager appreciated the size and scale of the campaign, which the district never had before. He said the activities were good to encourage people to begin using natural resources, especially wildlife more sustainably.

Public response to the Wildlife Crime Unit hotline also indicates that the campaign was effective in facilitating public reporting of illegal hunting and trade. While the hotline was in operation during the campaign (May – October 2010) more than 250 people called the hotline number. Out of these, 82 calls reported illegal hunting and wildlife trade, which led to 22 perpetrators being arrested and the cases turned over to the Wildlife Crime Unit for resolution and closure. The other 60 calls did not lead to sufficient information for the Wildlife Crime Unit to respond. The 168 calls that were not reporting wildlife crime were mostly from concerned citizens who were checking to see if the hotline was real, reachable and responsive. Most of the invalid calls were made just after the hotline was created and promoted at the beginning of the campaign.

## CONCLUSIONS

The assumptions in the conceptual model, the theory of change and results chains proved to be accurate. The pre and post surveys indicate a significant shift along the theory of change from knowledge to behavior change. Over time this shift should also lead to threat reduction to, and thus potential increase of, tiger and prey populations.

The change in interpersonal communication as a result of the campaign is particularly impressive. Anecdotally, we see that target audiences and outsiders still debate the campaign slogan 18 months after the post survey. The district governor of the campaign site regularly reminds Nam et Phou Louey staff that the campaign was effective at changing people's

**Table 5.** Statistical analysis on Theory of Change

Theory of Change	Chi squared		Degrees of freedom		P-value	
	Treatment	Control	Treatment	Control	Treatment	Control
<b>Knowledge</b>	106.497	80.403	1.00	1.00	0.0001	0.0001
<b>Attitude</b>	168.620	0.545	1.00	1.00	0.0001	0.4606
<b>Interpersonal Communication</b>	28.088	2.070	1.00	1.00	0.0001	0.1502
<b>Barrier Removal</b>	41.441	1.589	1.00	1.00	0.0001	0.2075
<b>Behavior change</b>	4.910	1.458	1.00	1.00	0.0267	0.2273

behavior but activities need to be maintained and expanded to new areas and that the project should build a statue of the Muntjac mascot to help keeping the campaign momentum to maintain changed behaviors. He suggests minor changes to the campaign slogan in line with the original campaign objectives, thus suggesting that he has also moved along the theory of change to a new stage.

Before the campaign, villagers rarely openly displayed their crossbows because they were unsure of their legality. Overt displays of villagers carrying their legal hunting equipment (crossbows) in front of the Wildlife Crime Unit suggests that villagers now understand the laws and find confidence in subsistence hunting.

In parallel with the effectiveness of the campaign there are several challenges. The first is that enforcement activities are risky and Wildlife Crime Unit staff are reluctant to take action at times. It is difficult to find strong leadership and staff with sufficient time to commit to the work. Without a strong Wildlife Crime Unit it is difficult to maintain the barrier removal that is necessary to support the campaign. A second challenge is communications between the hotline network and the Wildlife Crime Unit where cell phone coverage is limited and sometimes non-existent in some campaign locations. Third, the incentives for hotline reporters must be paid in a timely fashion and at times, the Wildlife Crime Unit is slow or non-responsive at rewarding reporters. If the informant network is not maintained, the Wildlife Crime Unit cannot keep abreast of illegal activities. Tracking unpaid fines is challenging and a new mechanism is needed to ensure that fines are paid and are announced on the district's public address system.

Although our monitoring indicates that the social marketing campaign was effective in contributing to behavior change that has led to an increase in reporting and punishment of wildlife crime, it is still not certain if these actions will be sufficient to achieve our threat reduction objectives or the goals for our targets. Preliminary results from recent biological surveys estimate that large ungulate populations in the National Protected Area are increasing but that tiger abundance has declined (Johnson *et al.* 2012).

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