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ROLES OF COMMUNITIES AND IMPASSIONED INDIVIDUALS IN CONSERVATION OF GIBBONS *(HYLOBATES LAR L.)* IN UPPER MAE HONG SON PROVINCE, NORTHERN THAILAND

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ABSTRACT

Information from 53 villages of seven ethnic groups demonstrated that communities and individuals play roles in gibbon conservation. Twenty-five villages with four ethnic groups (Karen, Shan, Lahu Na and Lawa) were found to protect gibbons. Karen traditional beliefs and community rules distinctively supported gibbon conservation. Cooperation with wildlife sanctuary personnel and individual contributions were also important in many villages. Loss of traditional beliefs and destructive exploitation by ethnic groups have tended to promote large-scale hunting of wildlife, including gibbons. The role of individuals in gibbon conservation is diverse. In a few cases, senior hunters who have observed and appreciated gibbon family life do not hunt them. There were approximately 293 individual gibbons in 66 groups of 33 subpopulations left in this surveyed area. Sub-populations consisted of 1–35 individuals, and contained from 1–7 social groups. Most groups occurred near Karen communities where people showed positive responses toward our conservation actions. The knowledge gained from this investigation will be used to prepare a strategic plan to protect gibbons and other wildlife in Mae Hong Son in the near future.

Key words: traditional beliefs, community, impassioned individuals, conservation role, ecological education, white-handed gibbon, Mae Hong Son, Thailand

INTRODUCTION

Since the first study of gibbons (*Hylobates lar*) in Chiang Mai Province about 70 years ago (CARPENTER, 1940), no systematic study of gibbons has been done in northern Thailand until 1997. A rapid survey on wildlife status in the northern part of the Pai River basin, Mae Hong Son Province, northern Thailand, was initiated by SRIKOSAMATARA *ET AL.*, (1999). The survey marked the beginning of gibbon study in this area. Then during 2002–2004, a detailed study of gibbons was conducted in a Karen village, Pang Mapha District. The study documented gibbon ecology and conservation activities by Karen and surrounding communities (YIMKAO & SRIKOSAMATARA, 2006). The field research reported here is extended from the previous studies mentioned above.

Gibbons in Mae Hong Son (*H. lar*) are critically endangered at a local scale. Their populations in this area are moderately isolated by forest fragmentation due to expanding slash and burn cultivation, logging and land encroachment by minorities, while gibbon hunting

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still continues (YIMKAO & SRIKOSAMATARA, 2006). However, some populations have been protected by Karen, some black Lahu, and Lawa communities.

Among minorities, Karen people still play a role in gibbon conservation both through their traditional beliefs and direct conservation practices. Traditionally, the Karen did not eat gibbons because it was forbidden by their ancestors. Eating gibbons is believed to bring unstable relationships among the eaters. In past years, Karen in Chiang Mai believed that gibbons calling near their cultivated fields brought good crop yields (CARPENTER, 1940; LEKAGUL & MCNEELY, 1977). Karen have long had a distinct respect for nature and wildlife (PHROMSAO & SILARUK. 1999), while Lisu typically have moved from one area to another and cleared the land for their crops (SRISAWAT, 2002; YIMKAO & SRIKOSAMATARA, 2006). The differences among tribal peoples in many cultural aspects impose a challenge for collaborative work which is the key to wildlife conservation in this area.

There are few or no studies that relate wildlife conservation to the culture and traditional beliefs of ethnic groups such as Karen, Lahu Nyi (Red Lahu), Lahu Na (Black Lahu) and Lawa. However, among ethnic groups, Karen are known for their conservation practices while Lisu, Hmong and Shan seem to have negative impacts on gibbons and their habitats. Detailed study is urgently needed in order to understand the real conservation situation in such local area. On the positive side, within or around those communities are individuals that play important roles in protecting wildlife.

Historically, there have been some individuals who has contributed a great deal to wildlife conservation at the country level which have had domino effects at local levels. In 1960 the first wildlife protection laws were passed through the efforts of Dr. Boonsong Lekagul, who came to be regarded as the "King of the beasts" in Thailand. After that, many protected areas were established and many conservation organizations were formed. One of the most important people in the field of wildlife conservation was Mr. Sueb Nakasatien, the former chief of Huai Kha Khaeng Wildlife Sanctuary. His dedicated work in wildlife and habitat conservation resulted in Thung Yai-Huai Kha Khaeng Wildlife Sanctuary becoming a world heritage site in 1990 (about one year after his death). Recently, Prof. Dr. Pilai Poonswad received the 2006 ROLEX Award and Chevron Conservation Awards. Her scientific research and community work have contributed greatly to the survival of Thailand's hornbills, especially in Budo-Sungipadi National Park, Pattani Province, southern Thailand. These people exemplify the importance of impassioned individuals to nature conservation.

Recently, Thai and international television programs have focused more and more on dedicated individuals and local communities as important parts of conservation. PAYUTTO (1998) explained that successful wildlife and forest conservation depends on intellectual improvement at the individual level. The integration of both impassioned individuals and local communities will be the major theme for our future work to conserve our natural world. In the context of Mae Hong Son, detailed study on the role of communities and various types of individual contributions (leadership, individual concern, responsibility, religious concern, personal experience, and cultural roots) may help in gibbon conservation in the area.

In this paper we report the results of a project, the aims of which were 1) to estimate the gibbon population in the study area, 2) to encourage local people to improve gibbon conservation via long-term study and monitoring, 3) to establish wildlife protection networking between communities, 4) to work closely with communities and individuals in building forest corridors for gibbons, and 5) to develop an English education module based on gibbon conservation for school children.

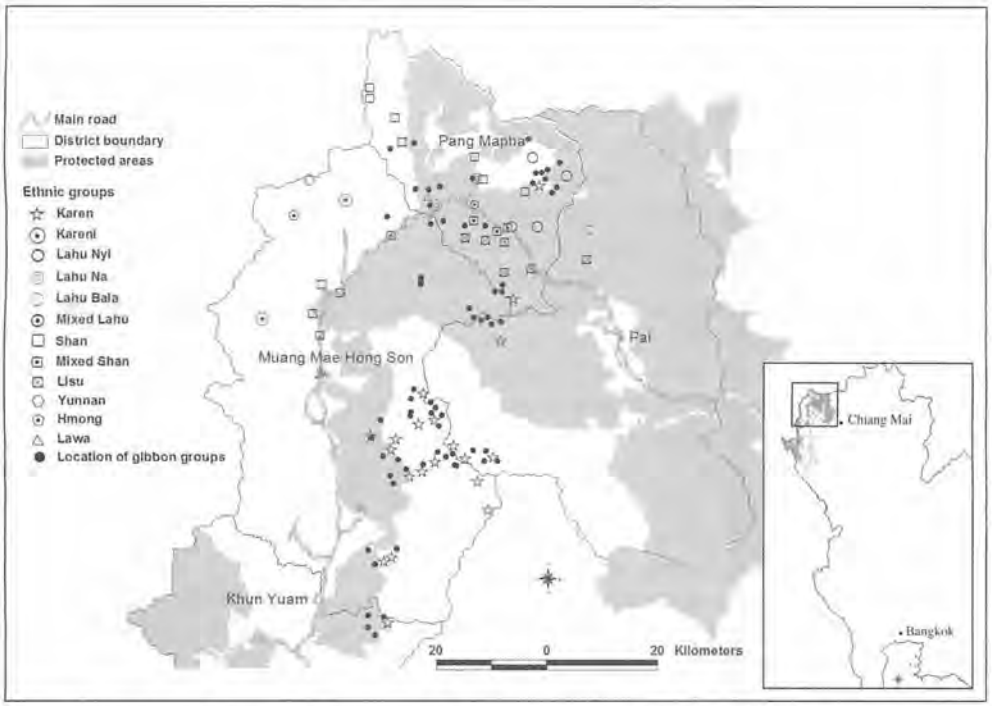

Figure 1. Distribution of surveyed villages in four districts (including Pai, Pang Mapha, Muang Mae Hong Son, and some parts of Khun Yuam) inside and outside protected areas of Mae Hong Son Province, and distribution of gibbon groups in four surveyed districts.

STUDY AREAS

The areas studied covered four districts and included seven ethnic groups in Mae Hong Son Province, northern Thailand (Figs. 1). Most of the land of the province was covered by Deciduous or Dry Evergreen Forest with limestone topography. A large number of villages of diverse minorities and their expanding cultivated lands are scattered over the area. In Pang Mapha District, the main study site, the geology consists of limestone, granite and sandstone resulting in a high diversity of plants and forest types (KHAMYONG *ET AL.*, 2003). The area is becoming a tourist hotspot, and large numbers of tourists come to the area each year. The area is covered by Tropical Mixed Deciduous, Deciduous Dipterocarp, and Pine-Deciduous Dipterocarp Forest (SANTISUK, 1988). Most of the area has been degraded by land encroachment and man-caused forest fires except some remote areas dominated by Karen communities (Fig. 5, 6). People in the area have low education or are uneducated. In fact, Mae Hong Son is known as the most "illiterate" province in the country (ANON, 2005). Hunting by government officials has been common in the area (NAOSAWAD, 1997).

MATERIALS AND METHODS

In order to study gibbon distribution, we visited 53 villages within four districts (including Pai, Pang Mapha, Muang Mae Hong Son and Khun Yuam) of Mae Hong Son Province, northern Thailand. Selected villagers from each village were interviewed using open-ended inquiry. Questions during interviewing were simple and similar. People were asked about the number, location, history of gibbons inhabiting the forest near the villages, and about hunting practices. Simple vocalization survey and direct observations (using 8×40 binoculars and 20–50× telescopes) were conducted from 0600–1200 h. Gibbon habitat quality (size and fragmentation) and human disturbances (frequency of hunting, exploitation behavior of local people) were evaluated briefly during the investigation. Direction and time of vocalizations of calling groups were recorded in the field notebook. GPS and compass bearings were used for locating gibbon groups. We determined the local names (mostly Karen) of streams or mountains or other landmarks as criteria in order to map the population and group locations.

Information about some "impassioned individuals" was acquired through direct conversation or interviews of villagers who knew those people well. During conversations and interviews, some important scientific information concerning the biology, behavior and ecology of gibbons was given to all interviewees. We then asked each of them to contribute to conserve the remaining gibbons as a part of our conservation campaign. In addition, art-works (paintings or plaster casts of gibbons) made by our students were given to some key persons who could contribute in some way to the spread of gibbon conservation awareness to other people in the village. As part of conservation participatory stimulation, conservation actions, such as creating artificial forest corridors for gibbons, gibbon watching trips for volunteers, our guests and local children, were conducted opportunistically in Pang Mapha District, the main study area.

For the integration of site-based research and education, we aimed at villages located adjacent to gibbon habitats to conduct informal ecological education projects in response to childrens' requests. The field exercises were conducted as a part of an English class. Various conservation activities were initiated through these classes in order to encourage gibbon conservation within the multi-cultural communities and protected areas. An education module has been developed during this project

RESULTS

Gibbon Population and Distribution

Gibbon populations in the area have become isolated within forest fragments of various sizes due to human activities such as land conversion for roads, cultivation, and settlements by diverse ethnic groups, including Shan (immigrated), Lahu, Hmong, Lisu and some groups of Karen. However, in some areas, it is possible to reconnect neighboring groups by making forest corridors (Fig. 3, 4).

Clearly, gibbon distribution and population status in this study area depend heavily on the conservation roles of individuals and their communities. We discovered gibbons inhabiting forest patches near 25 (of 53) villages of 4 ethnic groups, including 18 Karen, 5 Thai and Shan, 1 Lahu Na, and 1 Lawa. Most gibbons occurred near Karen communities,

Table 1. Approximate numbers of gibbon populations in four districts of Mae Hong Son province.

Districts	Number of villages	Gibbon population		
		Individuals	Groups	Group clusters*
Pang Mapha	10	83	19	11
Khun Yuam	3	44	10	5
Muang	8	114	26	12
Pai	4	52	11	5
Total	25	293	66	33

* Isolated populations

especially in Muang Mae Hong Son District where Karen have dominated the land (Fig. 5, 6). Group density is relatively high in the forest near Karen communities compared with other places around the study area. Habitat quality near Karen settlements is quite good for gibbons. However, in some Christian Karen villages, especially in urban areas, gibbons had disappeared many years ago since those communities started eating gibbons after abandoning their own traditional beliefs.

The total population of gibbons in the study area was approximately 293 individuals in 66 social groups fragmented into 33 subpopulations (completely isolated population) (Table 1). Each sub-population consisted of from 1 to 35 individuals. We estimated that there were 10 subpopulations consisting of 1 group, 7 containing 2–3 groups, 14 containing 4–6 groups and 2 containing 7 groups. Some groups had only 1 or a few group members.

The Role of Local Communities in Gibbon Conservation

The impacts of the 25 human communities on gibbon conservation vary greatly. One uses traditional beliefs only, 12 use their village's rules and beliefs, while 12 other communities still have unclear practices. Around some of the communities, there are neighboring communities including Shan and Lahu Nyi which show some degree of collaboration in protecting gibbons. In Huai Poo Ling sub-District (containing Christian and Buddhist Karen), Muang Mae Hong Son District, the community's role is prominent compared with other places. Unfortunately, around each Karen community there are other diverse groups that ignore their rules and hunt gibbons when they have a chance. Gibbons have disappeared from the forest near most villages where ancestral wildlife protection culture or traditions have been abandoned.

Most communities have tribal wisdom and folklore that encourage conservation. Our observations and interviews revealed that communities that live adjacent to gibbon habitat have normally learned about the animals from their ancestors' songs and tales, as well as their own experiences with gibbons. Such people have an impression that gibbon behavior reflects the behavior and mind of humans, which makes them more compassionate toward gibbons. In animist communities such as the Karen, there is a belief that having a meal of gibbon flesh may adversely affect their social relationships. For Lahu, who believe in an ethnic god, the gibbon is closely related to them because they believe that the gibbon is their god's wife or grandmother. Such beliefs, however, may not protect gibbons any longer because all cultures are

undergoing modernization. The beliefs of the community have changed with the introduction of consumerism and centralized development programs. In addition, the modern educational system has separated children from their local cultures. Many tribal communities in the study site have therefore lost the wisdom that protects wildlife. It is sad to see such wisdom disappear because it is highly relevant and important to gibbon and wildlife conservation today.

In the Karen community, villagers actively participated in our conservation efforts, especially in making artificial forest corridors such as stretching rope between trees. Villagers also provided interesting ideas to improve our corridor. Unfortunately, after 2–3 months, our corridors at two sites were removed by the neighboring Shan village. Impacts on the community by gibbon-watching trips conducted during the project cannot be evaluated.

Role of Impassioned Individuals in Gibbon and Wildlife Conservation

While the distinctive role of the community is collaborative, involving practicing traditional beliefs, community rules and wildlife protection traditions, the major role of individuals is based on personal attitudes, beliefs, and economic self interest (Table 2). In most villages in Mae Hong Son, there are some "passionate individuals" who are leaders in

Table 2. Roles of communities and individuals of different ethnic groups in gibbon conservation at present.

Group	Locations (ditricts)	Roles of community	Roles of individuals	Conservation tools: community/ individual
Karen	Pai, Pang Mapha, Muang, and Khun Yuam	Practice traditional beliefs, use of rotation planting techniques, collaboration in gibbon conservation	Respect to ancestral teaching and express self willing	Tradition, norms, beliefs, taboos, group philosophy/Self-interest, Congenital traits
Lawa[1]	Pang Mapha	collaboration among village & wildlife sanctural	Respect to ancestral taboos and wildlife protection laws	Conservation network, community rules /Self-interest, self awareness
Lahu Nyi	Pai, Pang Mapha	Respect for old beliefs (in the past)	Strict to old belief	Tradition, belief (abandoned)/Self-interest
Lahu Na	Pang Mapha	Respect for old beliefs and strict to the roles of WS.	Strict to old belief	Traditions, beliefs (nearly gone), WS rules / Self-interest
Lisu	Pai, Pang Mapha	None	Selective hunting	Self-interest
Hmong	Pai, Pang Mapha	None	Insignificant	Not clear
Tai[2] and Shan[3]	Pang Mapha	Follow local VIP	Conservation leader	Authority, self interest
Native Thai	Pang Mapha	None	Conservation leader	Authority, self-interest, religious doctrines

[1] Only one village found located in Pang Mapha District; [2] early immigrant Shan or native Shan;
[3] recent immigrant Shan; WS = Wildlife Sanctuary.

Table 3. Individual men and their contributions to wildlife conservation in Pang Mapha and Pai District.

Individual	Age	Ethnic group, origin	Status	Contribution categories	Time
A	70	Thai/Chiang Rai	Military	Leadership and individual concern	1976–1986
B	52	Thai/Chachoengsao	RFD	Responsibility	1999–present
C	>50	Thai/Chaing Rai	Military	Leadership	1986–present
D	45	Thai/Kanchanaburi	RFD	Responsibility and individual concern	1986–1990
E	>60	Thai Yai	Villager	Individual concern	1965–present
F	>45	Lahu Nyi	Villager	Individual concern	Present
G	65	Karen	Villager	Cultural roots and Individual concern	Present
H	68	Thai/Chiang Rai of village	Deputy chief	Responsibility and individual concern	1987–present
I	>45	Thai	Monk	Religious practice	Present
J	>45	Thai	Monk	Religious practice	1997–present
K	>50	Karen	Head man	Cultural roots	Present
L	50*	Thai Yai (Shan)	Head man	Leadership and individual concern	Death
M	55	Lisu	Hunter	individual concern	Present
N	36	Thai/Songkhla	Researcher	individual concern	2003–present

RFD = Royal Forest Department; * died during year 2004

their communities in conservation, but the effectiveness of such individuals has never been recognized or studied. More than half of those individuals identified in this project were Thai immigrants. In the study areas, such individuals exerted influence only in the past, when they had authority or power in particular circumstances. Afterward they had less influence on the community, especially over the new generation of villagers or immigrants. In this study, we categorized such individuals' roles in conservation into five categories: individual concern, responsibility, leadership, cultural roots, and religious practice (Table 3). Among these, individual concern appeared to be the main component. Their distinctive role was as conservation initiators. However, their positive impact on wildlife protection was normally limited to a particular time and place. The influence of these persons, however, still persists in these areas at the present time (Fig. 7).

The social status of such individuals in the community determined the success of their roles in conservation. One characteristic they shared was a strong personal interest in wildlife conservation. Most of them were experienced males with an average age of 53 years (range 36–70) (Table 3). However, most people in the different villages, especially Karen, have practiced wildlife conservation by protecting or by not hunting animals, especially gibbons, hornbills and some other bird species. The proportion of insider (local) and outsider (immigrant) conservation effort was about equal.

In addition, some hunters of other ethnic groups, who have witnessed a mother gibbon in her last moments of life, have stopped hunting gibbons, and this may have contributed to the survival of other wild gibbons.

Relation between Individuals and Communities in Gibbon Conservation

Based on our observations in each village, we believe that gibbon survival depends on the contributions of both communities and individuals combined in varying proportions. In Buddhist Karen villages, in general, it is difficult to separate the roles of individuals and the community in gibbon conservation. In some villages, individuals have played distinctive roles while in others the community's role is more prominent. In other ethnic groups, especially Shan and some mixed communities, individuals often play significant roles in gibbon conservation.

In some villages of Mae Hong Son, individual conservation efforts have played the dominant role. In Ban Huai Rai, Pang Mapha District, we found that one military officer who came to the area around 1976 had tried hard to protect gibbons and other wild species, including three species of macaques and wild cats. But after his departure, protection decreased because of weak support from the community and the continuous deforestation and hunting by surrounding Lisu. There are only two non-reproductive gibbons surviving in the forest protected by villagers and the dedicated contributions of one old man who arrived in this area long ago. However, sustainable conservation needs both individual and community-level efforts. Improving conservation by encouraging coordination and integration between society and individuals is strongly suggested.

Factors Influencing Gibbon Survival

The loss of beliefs and nature exploitation of some ethnic groups

Lahu: In the past, Lahu (which means "the hunter") strictly followed their traditional hunting principles or rules. For instance, they must inform a kind of spirit in the forest before going out to hunt. But now most Lahu have changed their hunting methods, and there are no such rules concerning hunting as before. This makes Lahu the most dangerous hunters for all species, including gibbons. The major threat to gibbons, however, is the unsustainable agricultural practices of the Lahu. Every year vast areas of primary forest have been cleared by Lahu groups (Lahu Nyi, Lahu Na and Lahu Bala).

Karen: Although the Karen are generally known as the "traditional conservationists", in fact their beliefs have changed as their population has increased and their needs for land and protein have grown. Compared with the other tribal peoples, however, their roles in wildlife and forest conservation remain distinctive.

Hmong: Hmong have distinctive skills in monocroping cultivation for commercial purposes. Their culture and lifestyle do not offer much help for the protection of wildlife and forests. However, for various reasons they do not eat gibbons. The Hmong people in Pai District were reported to invade a large area of forest due to extension of cultivation area. In the past, however, the Hmong in Chiang Mai likely conserved gibbons in the forest near their cultivated land due to the belief that gibbon calls bring large crop yields. (LEKAGUL & MCNEELY, 1977).

Shan or Tai Yai: In general, Shan are known as being dedicated followers of Buddhism, and they are generally kind and peaceful, but their attitudes toward wildlife conservation are the opposite. In this area, they consume a wide range of wildlife including forbidden species such as gibbons. Shan have no traditions concerning wildlife and no hunting rules, so most Shan villages have little wildlife left around them.

Figure 2. Most of the area of northern Mae Hong Son is covered by fragmented forest caused by the expansion of cultivate areas into primary forest.

Figure 3. Karen people helping us prepare the rope for stretching between trees as a temporary corridor.

Figure 4. Artificial corridors were made by Karen participants to reconnect fragmented forest at Nam Phaem stream, Ban Muang Phaem, Pang Mapha District.

Figure 5. Open forest surrounding Karen communities in Ban Nong Khao, Huai Poo Ling Sub District, and Muang Mae Hong Son District.

Figure 6. Huai Kung Stream flowing through Namtok Mae Surin National Park, Muang Mae Hong Son District. This forest is good habitat for gibbons.

Table 4. Tribes and their contribution to gibbon and habitat conservation based on presence or absence of gibbons and habitat condition near the villages.

Ethnic group	Gibbon presence	Habitat condition
Karen	3	3
Lawa[1]	3	3
Lahu Nyi	1	1
Lahu Na	2	1
Lisu	0	0
Hmong	0	0
Thai Yai[2] and Shan	1	1
Thai[3]	0	0

[1] only in village in four districts;
[2] earlier immigrant Shan;
[3] present immigrant Shan.
The score in the table represents the degree of success in conservation estimated by gibbon presence and absence and visual estimation of habitat condition (0 = bad; 1 = poor; 2 = fair; 3 = good).

The conservation roles of diverse ethnic groups as a whole are presented in Table 4. Karen, Lawa, and Lahu Na are main contributors to gibbon conservation in the study area. In Pang Mapha District, the main study area, illegal expansion of crop fields of ethnic groups, especially Shan, Lahu Na, Lahu Nyi and Lisu, is the main cause of depletion and fragmentation of gibbon habitat.

Behind the negative impact on forest and wildlife of resident and immigrant minorities is the change in their behavior brought about by modern cultural changes. Although most ethnic groups except the Shan had been forbidden to hunt gibbons, most of them have turned to hunting them except for the Buddhist Karen and some elder hunters of other minorities who have their own rules for hunting. Rarely, some hunters, for example, one Lahu in Pai and one Lisu in Pang Mapha District, have decided to stop hunting gibbons after they had observed the gibbons' family behavior (maternal care, last moment of life after being shot). This explains why some local hunters display moral attitudes toward animals. The behavior and attitudes of hunters are critical to wildlife conservation.

Hunting

At present, hunting of gibbons for food (and opportunistically for pets) occurs everywhere in the area by young men and by general subsistence hunters (not including Karen). Some ethnic groups in Mae Hong Son such as Karen (normally Christian) and Lahu Bala (Christian) still believe that gibbon flesh contains medicinal substances useful in treating body weaknesses. In the past gibbons sometimes were hunted for this purpose. In Pang Mapha and Pai District, Lisu, Lahu Nyi and Lahu Bala are known as regular hunters of gibbons while Karen, Lahu Na, and Lawa tend to protect the species passively. However, many young Lahu Na (< 35–40 years) hunt all wildlife opportunistically. In this area, gibbons have also been shot accidentally. Inexperienced hunters have shot a gibbon because they thought it was some kind of monkey or a large bird.

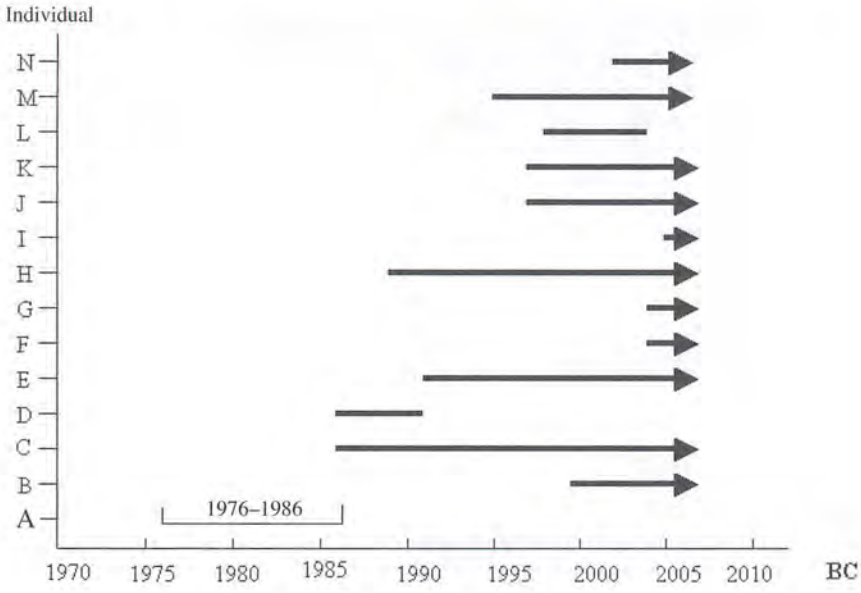

Figure 7. Time periods spent by impassioned individuals in the area protecting the gibbons.

Destructive land use

At present, almost all ethnic groups are invading primary and secondary forests for rotating cultivation and monoculture cultivation. In this area, after opium growing had ceased, the mono-crop cultivation practice of Lisu, Lahu and Hmong was one of the main causes of habitat loss and fragmentation, especially in Pai and and Pang Mapha District which are dominated by Lahu Nyi and Lisu. At present, planting exotic plants, especially rubber trees, has become widespread and may encroach greatly on wildlife habitat in the near future. The control of expansion of economic trees is crucial for forest protection in the area. Other actions promoted unwisely by the government that cause local problems are 1) immigration through the help of village chiefs in host villages of resident Shan in Thailand; 2) governmental development plans that bring about land clearance in vast areas of Mae Hong Son Province; 3) Local politicians and their promotion of destructive exploitation of wildlife and forest; and 4) lack of integration of conservation research and education in local communities and schools.

DISCUSSION

On the whole, the survival of gibbons in upper part of Mae Hong Son depends on many factors. The roles of local communities and impassioned individuals combined should not be overlooked. In some communities, the leadership and participation of individuals are necessary for long-term protection of gibbons. Individuals may act as initiators or supporters, depending on their status in the community. To promote gibbon conservation and better wildlife management in general, strengthening the role of impassioned individuals and supportive communities is an important strategy in the ethnic communities in Mae Hong Son.

The lack of basic information on wildlife (including gibbons) of this area, including distribution, population sizes, habitat quality and human impacts, affects local conservation management which requires clear information. At the same time, the loss of beliefs of ethnic groups will accelerate the extirpation of local species. Prior to our project there was no information available about local wildlife and most of the species present were at risk of extirpation from the area. Only a few short wildlife monitoring surveys had been done in some protected areas by the Wildlife Research Division of the National Park, Wildlife and Plant Conservation Department, and that information has never been utilized for any conservation actions in local communities (Bhidayabha personal communication). The report of SRIKOSAMATARA *ET AL.*, (1999) on the occurrence of gibbons in Mae Hong Son stimulated our initial study (YIMKAO & SRIKOSAMATARA, 2006) and this project. In the long run, we hope that our continuing study can stimulate more studies of the awareness of people in local communities on wildlife conservation as in Hainan, China, where the presence of field researchers and forest guards has been important for the survival of Hainan gibbons (*Nomascus concolor hainanus*) (ZHENHE *ET AL.*, 1989).

Abandonment of ethical traditional beliefs by replacing them with other religious beliefs such as Christianity should be examined because after the introduction of this religion, wildlife has been hunted and eaten even more (RABINOWITZ, 2001). The adverse effect of change in religion needs to be taught to local teacher and considered in educational programs.

Our failure effort to maintain artificial corridors in Muang Phaem Forests showed that it is important to inform and encourage adjacent communities to participate in conservation activities together. However, wildlife habitat restoration with the participation of local communities is still our priority; this may help solve the problem of manpower limitation in the national parks and wildlife sanctuaries in this area. At the end, we hope that such local participation can help villagers learn about the concepts and the importance of wildlife conservation.

At present, it is still not clear where and when the practice of hunting gibbons for traditional medicine, still performed by Karen and Lahu in Mae Hong Son, originated. Various species of gibbons and other primates have been at risk of being killed for traditional medicinal purposes for a long time in other parts of Southeast Asia. In Vietnam white-cheeked gibbons (*Nomascus leucogenys*) were also hunted for sale for traditional medicine (JONATHAN & ROBSON, 1993). Such practices, based on ignorance, may still occur in some villages in northern Thailand. We agree with CHAPMAN & PERES (2001) that scientific researchers, in long-term research, can play an important role in primate conservation by helping to educate local people. When people become better informed their behavior may change. In addition, inclusion of gibbon ecology and conservation topics in the national curriculum of primary schools (Ministry of Education, 2003) has been part of this project as one of the long-term solutions for gibbon conservation in this area.

FUTURE CONSERVATION ACTIONS

Future operations for conserving gibbons in this area should include 1) introduction of forest corridors to increase gibbon population connectivity; 2) a gibbon reintroduction program; 3) a local conservation awareness program; 4) a conservation ecotourism program; and 5) an English program for conservation for children and local communities. Protection of animal

from hunting and habitat degradation is a higher priority than costly reintroduction or captive breeding (JONATHAN & ROBINSON, 1993). But in Mae Hong Son, where protected areas have long existed, reintroduction may be necessary to restore some populations in which few gibbons are left. However, the primary role of reintroduction efforts is conservation education.

CONCLUSIONS

Gibbon conservation in the upper part of Mae Hong Son depends greatly on local community actions and on impassioned individuals. The proportions of the two main factors in each community vary considerably. Most Karen villages visited have conserved gibbons because of their traditional beliefs, in combination with community rules. In Karen and Lawa communities, village rules are made to prevent hunting by outsiders rather than members of the village, but for other ethnic groups, rules cover both inside and outside people. Lahu Na (1 village) and Lawa (1 village) in Pang Mapha District clearly help conserve gibbons through their own beliefs as well as through collaboration with the national wildlife sanctuary. One family of Lahu Nyi has protected gibbons living near the village on its own initiative. Two Shan villages studied protected one group of gibbons living near the villages by their community rules which were initiated by the chief of the village and one influential soldier.

In Pang Mapha District, gibbon protection was achieved through the action of important key persons in the early stage (in Shan communities, Pang Mapha District). However, hunting stopped only during the periods of time when those people were active in the area. In mixed and mosaic tribal communities such as in Pang Mapha District, translocation of impassioned individuals usually caused conservation to weaken and fail.

Wildlife sanctuary law enforcement in the area is weak and does not prevent deforestation by slash-and-burn and monoculture cropping practiced by minorities such as Lisu, Lahu and Shan, even within the sanctuary. Moreover, it is clear that most minorities have abandoned their traditional conservation practices. Without intervention from outsiders, their wildlife protection practices will be soon lost. In order to restore effective protection, we must strengthen law enforcement and attempt to restore the roles of local communities and individuals in conservation. This must be done in parallel with improvement of conservation education in local school curriculum.

One of the major threats to conservation in the region is illegal immigration. Regular immigration into the Shan area cannot be controlled and it adversely affects conservation in the host and neighboring villages in many ways. Laws controlling immigration must be improved and enforced. Without strong enforcement of wildlife and immigration laws, gibbons and other large wildlife species will continue to decline in northern Thailand.

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