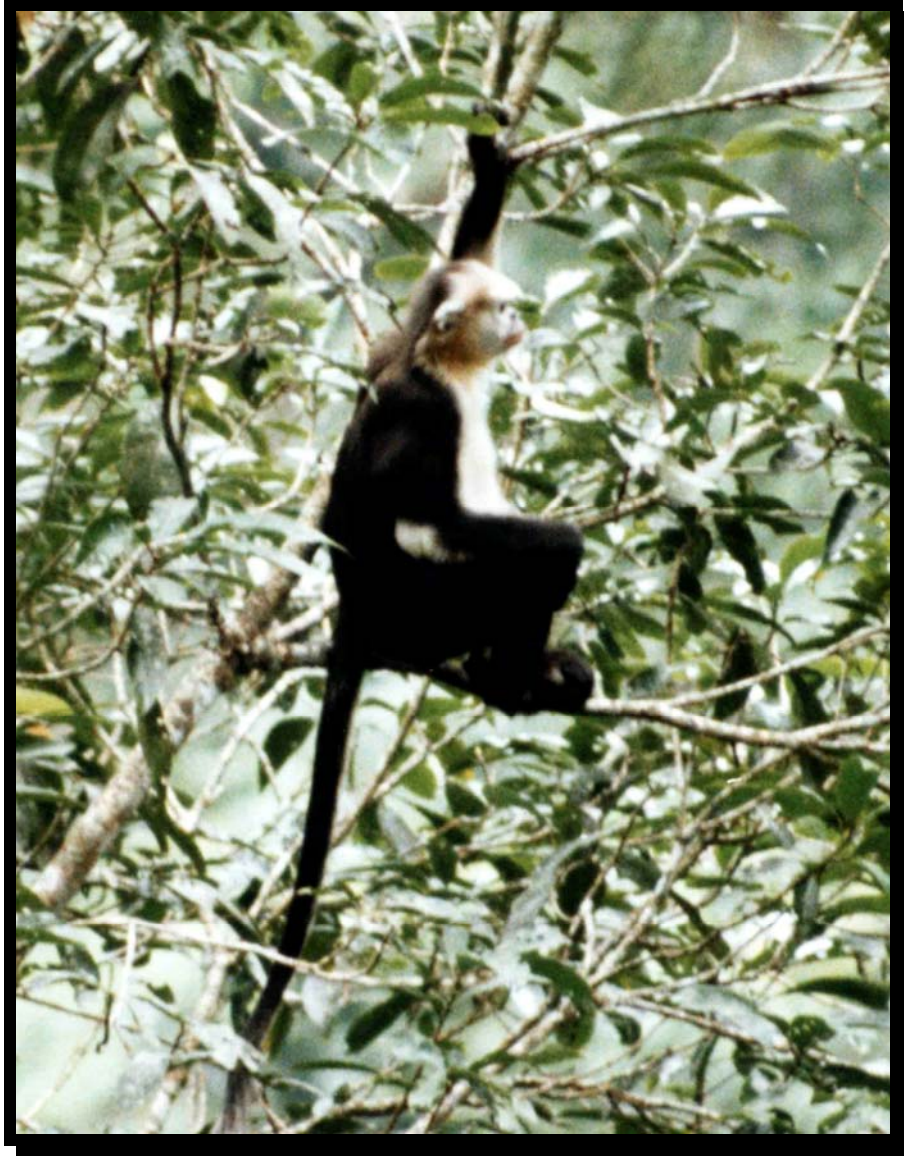


A CONSERVATION ACTION PLAN
FOR THE
TONKIN SNUB-NOSED MONKEY
IN VIET NAM



Compiled by
Le Xuan Canh and Ramesh Boonratana



SEAPA

South East Asian
Primatological Association

A Conservation Action Plan for the Tonkin Snub-Nosed Monkey in Viet Nam

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- Front Cover Photo: Adult male Tonkin snub-nosed monkey ©Ramesh Boonratana

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FOREWORD

All living things, including humans, have a close relationship with the environment in which they live in. Hence, humans will have to protect their environment for co-existence and for sustainable development. Viet Nam is endowed with diverse life forms and ecosystems that have a long evolutionary history, particularly within a geographical context. Thus, maintaining and using the natural resources not only have its benefits but also pose several challenges. The primary challenge include addressing a high human population density whose livelihoods are based on agriculture and forestry, traditional farming methods, and over-exploitation of natural resources which make the diverse life forms and ecosystems of Viet Nam subject to various threats of degradation or even their total loss.

Thus, awareness of these risks have lead the Government of Viet Nam to issue many policies as the means to protect its biodiversity, ecosystems and ecosystem functions. The establishment of a Protected Area System is one among many ways that aims at protecting and conserving whole ecosystems, wild fauna and flora, and precious species including the Tonkin snub-nosed monkey.

The Tonkin snub-nosed monkey is ranked as a Critically Endangered species in the 2006 IUCN Red List, in the Category I of the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES), as Critically Endangered in the 2006 Red List of Viet Nam, and in Category IB of Decree No. 32/2006/ND-CP in Viet Nam.

Since 1992, after the Tonkin snub-nosed monkey was re-discovered by scientists, many investigations and programs have been conducted to protect this species. These activities have raised the concern over the endangered status of the species. However, these efforts could not prevent the rapid decline of this species population, as well as the habitats in which they exist.

In order to disseminate information and call upon agencies and organizations to pay more attention to the conservation of the Tonkin snub-nosed monkey, the Institute of Ecology and Biological Resources (IEBR) and other concerned parties have produced *The Snub-nosed Monkey Action Plan*. This action plan is compiled based on the relevant governmental documents related to the conservation of species and habitats, and have made several important and appropriate recommendations towards the conservation and protection of this species and its habitats. Thus, *The Snub-nosed Monkey Action Plan* is a document that will guide relevant conservation organizations, agencies and institutes to co-operate in preventing the Tonkin snub-nosed monkey from extinction.

Hence, it is with great pleasure that I present *The Snub-nosed Monkey Action Plan*. Finally, it is my sincere hope that the action plan will receive both local and global support, and that we will soon see the implementation of the actions recommended in this action plan.

Thank you.



Prof. Dr. Sc. DANG VU MINH
President

Vietnamese Academy of Science and Technology

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This production of this Action Plan was made possible with the assistance of numerous people. Foremost is Mr. Noel Rowe, the Director of Primate Conservation Inc., who saw the urgent need for a species action plan to safeguard the Tonkin snub-nosed monkeys from possible extinction. Thus, Primate Conservation, Inc. provided financial support for the preparation and publication of the Action Plan. Many of those who provided significant input to the document through consultations or by other means are listed in Appendix I.



Adult females © Ramesh Boonratana

ABBREVIATIONS AND GLOSSARY

Administration and services area	refers to a designated area within a Special-use Forest, where infrastructure and tourism development are permitted within the protected area
ASEAN	Association of Southeast Asian Nations
CITES	Convention for International Trade in Endangered Species
CR B1ab(i,ii,iii,iv,v); C1+2a(i)	Critically Endangered based on the following criteria, and it is therefore considered to be facing an extremely high risk of extinction in the wild: B. Geographic range in the form of B1 (extent of occurrence): 1. Extent of occurrence estimated to be less than 100 km ² : a. Severely fragmented or known to exist at only a single location. b. Continuing decline, observed, inferred or projected, in any of the following: (i) extent of occurrence (ii) area of occupancy (iii) area, extent and/or quality of habitat (iv) number of locations or subpopulations (v) number of mature individuals. C. Population size estimated to number fewer than 250 mature individuals and either: 1. An estimated continuing decline of at least 25% within three years or one generation, whichever is longer, (up to a maximum of 100 years in the future) OR 2. A continuing decline, observed, projected, or inferred, in numbers of mature individuals AND at least one of the following (a-b): a. Population structure in the form of one of the following: (i) no subpopulation estimated to contain more than 50 mature individuals
Enclave villages/settlements	refers to villages/settlements that are located within the boundaries of protected areas
EVN	Electricity of Viet Nam, a state-owned company
Feasibility study	refers to an official document that assesses the costs and benefits of establishing a protected area at a site, thereby assisting decision-makers to decide whether a site should become a candidate for protected area establishment.
Forest rehabilitation area	refers to a designated area within a Special-use Forest, which is protected and managed for forest rehabilitation.
FPD	Forest Protection Department
GIS	Geographical Information System
GPS	Global Positioning System
GoV	Government of Viet Nam
IEBR	Institute of Ecology and Biological Resources

IUCN	The World Conservation Union
IUCN/SSC	IUCN Species Survival Commission
Management board	refers to the staff of a protected area. In the case of Special-use Forests, the staff comprise forest guards, administrative staff and support staff.
MARD	Ministry of Agriculture and Rural Development
Nature Reserve	refers to a natural area established to ensure natural evolution. Nature reserve is one of the three management categories of Special-use Forest according to Prime Ministerial Decision 08/TTg, dated 11 January 2001. According to the Prime Ministerial decision, there are two sub-categories of nature reserve: strict nature reserve and species/habitat conservation area.
NGO	Non-governmental Organization
NR	Nature Reserve
NT2-WMPA	Nam Theun 2 – Watershed Management and Protection Authority
PDR	People’s Democratic Republic [as in Lao PDR]
PNR	Proposed Nature Reserve
SEAPA	South East Asian Primatological Association
SHCA	Species/Habitat Conservation Area
Special-use Forest	refers to a management category of forestland with the principal objectives of biodiversity conservation, scientific research, protection of sites of historical and cultural importance, and tourism development. Special-use Forests comprise national parks, nature reserves and cultural and historical sites. Management boards, under the management of the relevant province or MARD usually manage special-use Forests.
Strict protection area	refers to a designated area within a Special-use Forest where all activities that alter the natural landscape are prohibited
TSM Conservation Area	refers to a forested area located within the buffer zone of the Du Gia Nature Reserve designated by the Ha Giang FPD for the protection and conservation of the Tonkin snub-nosed monkey and its habitats.
TQ workshop	refers to the Tonkin snub-nosed monkey Action Plan workshop held in Tuyen Quang on July 25 th , 2005.

1. INTRODUCTION

1.1 Scientific Background

According to the best available information, there are at least 275 mammal species, 828 bird species, 300 reptile species, 102 amphibian species, and more than 8,000 vascular plant species in Viet Nam. Likewise, the primate fauna is both rich and diverse. With recent changes in the taxonomy of Asian primates, there are now 26 primate taxa representing 19 species in Viet Nam (Brandon-Jones *et al.*, 2004), of which at least six primate taxa are endemic to the country.

However, they are among the most threatened in the world, with a majority of the primates considered either Critically Endangered or Endangered according to the *2006 IUCN Red List of Threatened Species* (IUCN, 2006). Several taxa are now reduced to the low hundreds or even lesser, and practically all are subject to the ongoing effects of habitat loss and hunting. In fact, four or about 16% of *The World's Top 25 Most Endangered Primates* occur in Viet Nam, as determined by the IUCN/SSC Primate Specialist Group at the 20th Congress of the International Primatological Society. These four comprise the Delacour's langur (*Trachypithecus delacouri*), the Golden-headed langur (*Trachypithecus poliocephalus poliocephalus*), the Gray-shanked douc (*Pygathrix nemaeus cinerea*), and the Tonkin snub-nosed monkey (*Rhinopithecus avunculus*).

Globally, the Tonkin snub-nosed monkey is categorized as Critically Endangered [CR B1ab (i,ii,iii,iv,v); C1+2a(i)] according to the *2006 IUCN Red List of Threatened Species* (IUCN, 2006), and it is listed in the Appendix I of CITES. In Viet Nam, the species is similarly categorized as Critically Endangered according to Viet Nam's Red Data Book (MoSTE, 2000), and is listed in the Appendix I of GoV Decree No. 48/2002. An analysis by Boonratana *et al.* (2001) revealed the Tonkin snub-nosed monkey as one of the highest priority primate taxa in Viet Nam deserving immediate conservation action to ensure that they become neither extirpated nor extinct.

Since 1992, a number of projects and activities have been carried out on the Tonkin snub-nosed monkeys or in their habitats, and these have drawn attention to the worsening plight of their populations. Yet, these praiseworthy efforts have not been enough to arrest the rapid decline of the Tonkin snub-nosed monkey populations, their habitats, and the ecosystem functions that support them.

Hence, a ten-year Conservation Action Plan for the Tonkin snub-nosed monkey is deemed crucial to prevent the probable extinction of the species. As opposed to most species action plans, this Action Plan is developed for ten years following the GoV's recommended duration for action plans for the country. The action plan, developed through consultations with the relevant stakeholders, will immediately become a useful conservation tool providing the relevant GoV agencies with a comprehensive and well-planned strategy for implementing essential field activities, and offering donor agencies and NGOs a coordinated, nationally-endorsed program to invest in.

1.2 Legal Basis

This Action Plan has been developed on the basis of the following legal documents:

1. Forest Protection and Development Law of Viet Nam No. 29/2004/QH11 dated December 30th, 2004. Chapter III, Section 2, Article 41 'Protection of forest plants and animals' which states that:
 - i. The exploitation of forest plants must comply with the forest management regulation issued by the Prime Minister as well as forest exploitation processes and regulations promulgated by the Ministry of Agriculture and Rural Development.
 - ii. The hunting, catching, trapping and caging of forest animals must be permitted by competent State bodies and comply with law provisions on wildlife conservation.

- iii. The endangered, precious and rare forest plant and animal species; and their gene sources must be managed and protected under special regimes.
2. GoV Decree No. 32/2006/ND-CP dated March 30th, 2006 on management of rare and precious animals and plants, defining and dividing endangered, precious and rare forest plants and animals into two groups. Group I comprises those strictly banned from exploitation and use for commercial purposes, and Group II comprises those restricted from exploitation or use for commercial purposes. The Tonkin snub-nosed monkey is listed in the Group IB, therefore in contravention of the provisions of law it is prohibited to exploit, hunt, trap, catch, cage, slaughter, transport, process, advertise, trade in, use, store, import and export the Tonkin snub-nosed monkey. The Decree also specifies conditions and permits required for exploitation, transportation, storing, processing and trading of endangered, precious and rare forest plants and animals exploited from nature and products thereof; and provides for rights and obligations of forest owners toward special use forests and the said plants and animals.
3. The GoV Prime Minister's Decision No. 34/2005/QD-TTg of February 22nd, 2005 promulgating the Government's action program for implementation of the Politburo's Resolution No. 41/NQ-TW of November 15th, 2004 on environmental protection in the period of accelerated national industrialization and modernization. This action program concretizes tasks and solutions for implementation of the Politburo's Resolution No. 41-NQ/TW on environmental protection in the period of accelerated national industrialization and modernization with a view to preventing, mitigating and overcoming environmental pollution, degradation and incidents; restoring and step by step raising the environments quality; closely, rationally and harmoniously combining economic development and social advancement with environmental protection toward the objective of a prosperous people, a strong country and a just, democratic and civilized society.
4. The GoV Prime Minister's Instruction No 12/2003/CT-TTg dated on May 16th, 2003 on urgent strengthening of methods for forest protection and development. With this important Instruction, all local authorities are required to undertake countermeasures to redress shortcomings and weaknesses and to re-establish rules in the management and protection of forest resources.

1.3 Objective and Goals

Thus, the overall objective of this Action Plan is to re-establish viable populations of Tonkin snub-nosed monkeys within secure habitats throughout their range in Viet Nam. Four broad goals have been identified towards achieving this objective:

Short-term goals:

1. To secure adequate protection for currently known populations of the Tonkin snub-nosed monkeys and their habitats, to arrest any further decline in populations and habitats within 3 years.
2. To secure protection of habitats available to the Tonkin snub-nosed monkeys through establishing new protected areas, extensions of existing ones, or establishing land corridors between protected areas with Tonkin snub-nosed monkey populations within 3 to 5 years.

Long-term goals:

1. To restore degraded habitats formerly used by existing populations of the Tonkin snub-nosed monkeys, and to restore Tonkin snub-nosed monkey populations to minimum viable levels within 5 to 10 years.
2. To restore viable populations of Tonkin snub-nosed monkeys to their former ranges in Viet Nam over the next 10 years or more.

2. MORPHOLOGY, ECOLOGY AND BEHAVIOR

2.1 Morphology

The Tonkin snub-nosed monkey is one of four primate species that belongs to the genus *Rhinopithecus* or the 'snub-nosed monkey' group. The Tonkin snub-nosed monkey is endemic to Viet Nam, while the Yunnan snub-nosed monkey (*Rhinopithecus bieti*), the Guizhou snub-nosed monkey (*Rhinopithecus brelichi*), and the Golden snub-nosed monkey (*Rhinopithecus roxellana*) are endemic to China. Like other members of the sub-family Colobinae, the Tonkin snub-nosed monkey characteristically possess an enlarged and sacculated fore-stomach, where their food is fermented by bacterial action to counter toxic substances and to break down cell wall constituents (Bauchop & Martucci, 1968; Kuhn, 1964; Ohwaki *et al.*, 1974).

The Tonkin snub-nosed monkey is a large, slender-bodied, sexually dimorphic, arboreal colobine. Adult males weigh an average of 14 kg, with a head and body length about 65 cm and tail length about 83 cm; whereas adult females weigh an average of 8.5 kg, with a head and body length of 54 cm and tail 68 cm long (Ratajszczak *et al.*, 1992). Adults of both sexes have an upturned nose, with the tip nearly reaching the forehead. The digits of their hands and feet are longer and more slender than other *Rhinopithecus* species (Napier & Napier, 1967).

Adult Tonkin snub-nosed monkey of both sexes have black hands and feet; black fur on the back and outer sides of limbs; and creamy-white fur on the inner sides of limbs, back of thighs, elbows, forehead and face (Boonratana & Le 1994; 1998a). Although not previously reported, the fur on the back of adults' heads is brownish, which extends down to the upper parts of their shoulder (Boonratana & Le, unpublished data; H.T. Dong, pers. comm., 2006). Conversely, Nadler *et al.* (2003) described Tonkin snub-nosed monkey as dorsally dark brown instead of black. This suggest possible variations between populations, or at least between individuals. However, it is also possible that descriptions based on museum specimens could have been erroneous, as chemical preservative and insecticide, and long exposure to strong light may have discolored the pelage.

The tail is long, dorsally black, ventrally creamy-white, ending in a creamy-white tuft; and strands of long creamy-white hairs are visible from the base to just above the tufted tip in mature individuals (Boonratana & Le 1994; 1998a). On the throat, there is an orange patch, and the facial skin is bare and pale blue around the eyes and nose, and is bluish-black around the mouth (Boonratana and Le, 1994; 1998a). The orange throat patch, the bluish-black around the mouth, and strands of creamy-white hairs on the tail are more prominent in the adult males (Boonratana and Le, 1994; 1998a). Males have a black colored penis and a white colored scrotum (Brandon-Jones, 1985). Older infants and juveniles have a pelage coloration that is gray rather than black (Boonratana and Le, 1994, 1998a). Recent observations show whitish gray pelage in younger infants, and completely white pelage in neonates (H.T. Dong, pers. comm., 2006). In addition, infants and juveniles lack the orange throat patch and the strands of long creamy-white hairs on their tails, the dark coloration around the mouth is also not prominent (Boonratana and Le, 1994, 1998a).

2.2 Behavior and Ecology

The Tonkin snub-nosed monkey lives in tropical evergreen forests associated with karst limestone hills and mountains, and has been recorded at elevations between 200 to 1,200 m. The Tonkin snub-nosed monkey is a wide-ranging animal, with home ranges of different groups apparently overlapping completely. The former suggests food resources that are widely distributed, and the latter imply inter-group tolerance and the absence of defense for food resources (Boonratana & Le, 1994; 1998a).

A study in the Tat Ke Sector of the Na Hang Nature Reserve estimated the Tonkin snub-nosed monkey to be living at a density of less than 8 individuals/km² (Boonratana & Le, 1994; 1998a), or at an estimated biomass of 48 kg/km². In contrast, an estimated population of 29 to 60 individuals occupying about 1.6 km² of the TSM Conservation Area (K.Q. Le, oral presentation at TQ workshop) therefore suggests a density between 18 to 38 individuals/km², or a biomass possibly up to 228 kg/km². However, recent observations at the same site gave a population count at 81 individuals, with possibly up to 90 individuals, individuals occupying an area about 10 km² (H.T. Dong, pers. comm., 2006). Thus, at a density of at least 8 individuals/km², or at an estimated biomass of 48 kg/km². Prolonged field observations and better coverage in the latter most likely account for these differences at the TSM Conservation Area.

Boonratana and Le (1998a) suggested that hunting pressure likely resulted in the low density estimate in the Tat Ke Sector, and that densities may have reached 20 individuals/km² in former times. Reasons for the low density estimate (8 individuals/km²) at the TSM Conservation Area have yet to be determined. Nevertheless, if the assumption of 20 individuals/km² in former times is correct, then the biomass of the Tonkin snub-nosed monkey in suitable habitats can be expected to reach up to 120 kg/km².

The social structure of the Tonkin snub-nosed monkey appears to be flexible and comprise one-male and all-male groups, with different groups frequently coming together exhibiting a secondary level of social organization – the band, with fission-fusion of stable one-male groups within bands (Boonratana & Le, 1994; 1998a). This is in contrast to earlier reports of multi-male groups (Ratajszczak *et al.* 1990, 1992). Earlier reports were mainly based on villagers' observations and a "brief" observation by Ratajszczak *et al.* (1992). These observations have mistakenly assumed the association between various groups to be a single multi-male group. The mean size for one-male groups in the Tat Ke Sector ranged from six in 2005 (R. Boonratana, pers. obs.; H.T. Dong, pers. comm., 2006), to 13 in 1998 (Boonratana, 1999), and to 15.2 in 1993 (Boonratana & Le, 1994; 1998a). In the TSM Conservation Area, the mean size of one-male groups is about 10.5 (H.T. Dong, pers. comm., 2006).

Diurnal observations on the activity budget of the Tonkin snub-nosed monkey during a short study showed that the species spent 39.81% of its time resting, 23.3% at vigilance, 9.71% grooming, and 2.91% playing (Boonratana & Le, 1994; 1998a).

The Tonkin snub-nosed monkey travels within trees by quadrupedal walking, climbing and leaping; between trees by leaping, hanging from the branches and moving one arm in front of the other, and occasionally by brachiation, with only adults exhibiting the last two types of locomotion (Boonratana & Le, 1994; 1998a). Although rare, bipedal movement on a supporting branch, and quadrupedal walking on the ground have also been observed (X.C. Le, unpublished data; H.T. Dong, pers. comm., 2006).

Four distinct vocalizations have so far been distinguished in the Tonkin snub-nosed monkey: soft 'hoo', soft 'huu chhhk', loud and rapid 'huu chhhk', and rapid 'chit'. Soft 'hoo' was usually heard when groups were regrouping after they had separated when disturbed (H.T. Dong, pers. comm., 2006). Soft 'huu chhhk' was apparently used as a form of contact call when individuals of a group or groups were spread over 5 meters or more (Boonratana & Le, 1994; 1998a). Loud, repeated and rapid 'huu chhhk' were used as alarm calls whenever the monkeys detected the presence of humans or other threats (Boonratana & Le, 1994; 1998a), and rapid 'chit' were repeatedly uttered while fleeing upon sudden unexpected encounters with humans or possibly other threats (H.T. Dong, pers. comm., 2006). Observations suggest that 'hoo' and 'chit' vocalizations are made on exhalation. Whereas 'huu chhhk' is made on a combination of quick inhalation 'huu' and exhalation 'chhhk'. However, confirmation is subject to analysis of sound recordings should they become available.

There is only one known observation on the sexual behavior of the Tonkin snub-nosed monkey, and this comprised a single-mount sexual copulation (Dong *et al.* in prep.). Sequentially,

the adult male positioned himself behind an adult female, rested his feet on the supporting branch, held her midsection with both his hands, mounted and then penetrated the female from the rear. Upon penetration, the male made repeated thrusting movements that lasted for 43 seconds. The adult male sat down on the supporting branch after dismounting, waved his right forearm in front of his face, and briefly shook his head from side to side. In contrast, after copulation, the adult female climbed down to a lower branch of the same tree, and then entered a neighboring tree.

The Tonkin snub-nosed monkey does not restrict its diet to leaves, but include fruits and seeds. Preliminary observations on their food choice suggest that they are selective feeders, frequently feeding on parts of leaves (38%), unripe fruits (47%), and seeds of ripe fruits (15%) (Boonratana & Le, 1994; 1998a). Observations from late September to mid December 1993 showed that the monkeys preferred fruits (and seeds) to leaves, possibly because fruits were more abundant during those months than in other months (Boonratana & Le, 1994; 1998a). Furthermore, fruits and seeds are important sources of energy, being rich in protein, carbohydrates and lipids (McKey *et al.*, 1981; Waterman, 1984). Similarly, examination of the monkeys' stomach contents revealed a frugivorous diet (Pham, 1993; 1994). Conversely, Ratajszczak *et al.* (1990; 1992) reported a highly folivorous diet. This may likely be due to observations that were made during different seasons, implying a likely seasonal shift in diet.

Pham (1993; 1994) also reported the Tonkin snub-nosed monkey feeding on food items belonging to 52 plant species based on analyses of stomach contents. However, given that members of the sub-family Colobinae masticate their food well, and that foods are subjected to a fermentation process in the colobines' forestomach, therefore it will be impossible to identify either plant parts or species from visual inspections of the stomach contents. Thus, this information should be treated as doubtful until verified by field observations. Ongoing observations have so far identified 14 of the food plant species (table 2.1) with certainty (H.T. Dong, pers. comm., 2006). An improved list in addition to ecological and behavioral studies are therefore expected to provide an reliable assessment on the distribution, size and abundance of food resources and their influence on the Tonkin snub-nosed monkey.

Table. 2.1: Plant species and parts eaten by Tonkin snub-nosed monkey

Plant Species	Part Eaten
ANACARDIACEAE <i>Allopondias lakonensis</i> Pierre	Mature Leaves, Young Leaves
ARALIACEAE <i>Trevesia palmata</i> (Roxb) Vig <i>Schefflera delavayi</i> (Fr.) Harms var. <i>pubinervis</i> Grushv. & Skorts.	Unripe Fruits, Young Leaves Mature Leaves
CLUSIACEAE <i>Garcinia fagraeoides</i> A.Chev	Mature Leaves
EBENACEAE <i>Diospyros choboensis</i> Lec.	Mature Leaves
ELAEOCARPACEAE <i>Elaeocarpus petiolatus</i> (Jack.) Wall.	Mature Leaves
EUPHORBIACEAE <i>Antidesma montanum</i> Blume <i>Bridelia monoica</i> (Lour) Merr	Mature Leaves Mature Leaves
MYRTACEAE <i>Syzygium zeylanicum</i> (L.) DC. <i>Syzygium wightianum</i> Wight	Mature Leaves Mature Leaves
SARCOSPERMACEAE <i>Sinosideroxylon wightianum</i> (Hook. et Arn.) Aubr.	Mature Leaves
THEACEAE <i>Eurya ciliata</i> Merr.	Mature Leaves
ULMACEAE <i>Celtis sinensis</i> Person	Ripe Fruits
VERBENACEAE <i>Premna aff. chevalieri</i> P. Dop	Mature Leaves

Source: H.T. Dong, pers. comm., 2006.

3. POPULATIONS, THREATS, AND CONSERVATION STATUS

3.1 Distribution and Population Size

Figure 3.1 illustrates the current geographic distribution of confirmed and provisionally recorded Tonkin snub-nosed monkey populations. In the past, records show that the monkeys once inhabited seven provinces: Ha Giang, Tuyen Quang, Cao Bang, Yen Bai, Bac Kan, Thai Nguyen and Quang Ninh. Observations that are more recent show that they are currently extant in Ha Giang, Tuyen Quang, and Bac Kan Provinces, and possibly in Thai Nguyen Province.

Table 3.1 provides a summary of the highest figure observed/estimated for confirmed and provisional records of Tonkin snub-nosed monkey populations within the last 15 years. The highest count for any single population is at 81 individuals, made in April 2006, in the TSM Conservation Area (H.T. Dong, pers. comm., 2006). In contrast, the highest estimate for any single population was in the Ban Bung sector of the Na Hang Nature Reserve at between 90 to 110 individuals in 1992 (Ratajszczak *et al.*, 1992).

However, these data are more than a decade old, therefore may not reflect the current situation. Of major concern, is that the trend suggests a decline in population sizes in both sectors (table 3.1). However, this in contrast to the current figure reported by the Na Hang District FPD (Le Hong Binh, oral presentation at TQ Workshop). Assumptions are not possible for other populations, but based on the precautionary principle, this Action Plan will propose conservation actions on the assumption that Tonkin snub-nosed monkeys are rapidly declining throughout their range.

Based on the ‘best’ observed or estimated figures within the past five years (table 3.1), the global Tonkin snub-nosed monkey population is estimated to be about 250 individuals. The global population may actually be higher than this, given that the occurrence of the species is likely possible in the provisionally recorded areas. Nevertheless it is ‘safer’ to develop strategies and to plan actions based on a more conservative figure.

3.2 Current Threats

The current threats faced by the Tonkin snub-nosed monkey throughout its range are human-induced and can be broadly grouped into hunting and non-hunting activities. Although purportedly not a target species and is ‘foul-tasting’, the taxon is nevertheless shot when encountered, and are consumed or parts of it are made into medicinal products. There are unconfirmed reports of the taxon, its body parts or medicinal products made from it being traded locally and to neighboring China. Hence, whether opportunistically hunted or not, the Tonkin snub-nosed monkey inevitably ends up as food or medicine. Several gunshots heard almost daily during field trips to the Na Hang Nature Reserve in September 2004 and January/February 2005 (R. Boonratana, pers. obs.), indicate a high hunting pressure in the area.

Current threats from non-hunting activities largely resulted from a long history of human activities that have had cumulative impacts on the Tonkin snub-nosed monkey populations through loss, change and fragmentation of suitable habitats. Past activities included excessively intense and unsustainable legal/illegal logging, gold extraction practices, shifting and settled cultivation, and miscellaneous land development activities.

The majority of the human society throughout the species’ range is primarily agricultural-based. This, plus a fast expanding human population, limited available agricultural land, a strong cultural preference among many ethnic communities for swidden practices, and free-ranging livestock still remain as major threats to the remaining habitats. The situation is further worsened by the presence of enclave settlements i.e., the settlements located within the protected areas with known populations of Tonkin snub-nosed monkeys.

In recent years, the development of a hydropower project by EVN-Electricity of Viet Nam along the Gam River in Na Hang is causing large areas to be lost to construction. In addition, the inundation caused by the hydropower plant is expected to reduce habitats available to the Tonkin snub-nosed monkey population in the Na Hang Nature Reserve. Of more immediate concern, is the sudden increase in human populations (construction workers) which may lead to increased demands for wild meat, or the local villagers having to rely more on the forest produce (including wild meat) to supplement their income to meet rising costs of necessities and other goods. The former is evident by the number of restaurants in Na Hang offering wild meat on their menu (R. Boonratana, pers. obs., 2004; 2005). Nevertheless, the development of a hydropower project is inevitable given that electricity currently generated throughout the country is unable to meet the domestic demand.

3.3 Conservation Status

In Viet Nam, the Tonkin snub-nosed monkey is listed as Critically Endangered in the Red Data Book of Viet Nam (MoSTE, 2000), and is listed in Appendix 1 of GoV Decree No. 48/2002. To protect the species and habitats, the following protected areas were established:

1. Na Hang Nature Reserve in 1994 by Tuyen Quang People's Committee Decision No. 274/QD-UB to cover a total land area of 41,930 ha, comprising 27,520 ha strict protection area, 12,910 ha forest rehabilitation area, and 1,500 ha administration and services area. The 27,520 ha strict protection area comprises two non-contiguous areas: 12,520 ha in the Tat Ke Sector and 15,000 ha in the Ban Bung Sector.
2. Du Gia Nature Reserve in 1994 by Ha Giang People's Committee Decision No. 647/QD-UB to cover a total land area of 24,293 ha, comprising 7,652 ha strict protection area, 14,294ha forest rehabilitation area, and 2,347 ha administration and services area. In addition, there is a buffer zone of 19,700 ha.
3. Cham Chu Nature Reserve in 2001 by Tuyen Quang People's Committee Decision No. 1536/QD-UB to cover a total land area of 58,187 ha, comprising a strict protection area of 17,904 ha and a forest rehabilitation area of 40,283 ha.

However, it should be noted that the presence of the Tonkin snub-nosed monkey population in the Du Gia Nature Reserve has never actually been investigated. The extant Tonkin snub-nosed monkey population in Ha Giang Province actually occurs in an isolated forest within the buffer zone of the Du Gia Nature Reserve. This area measuring about 1,000 ha currently does not receive any Special-use Forest status. Nevertheless, the Ha Giang FPD has designated the area as the TSM Conservation Area, and has been actively protecting the species and habitats since 2002 (T.V. Dam, pers. comm., 2005).

The Tonkin snub-nosed monkeys are provisionally recorded in some of the proposed protected areas in the region (figure 3.1). The confirmation of the species in any of these areas will assist in conferring a protected area status to the area(s) concerned.

Table 3.1: Population sizes of Tonkin snub-nosed monkeys

Site	Date	Maximum Observed	Estimated	Remarks	Source
Tat Ke Sector, Na Hang NR, Tuyen Quang Province	1992		40 to 50	figures based on interviews	Ratajszczak <i>et al.</i> , 1992
Tat Ke Sector, Na Hang NR, Tuyen Quang Province	1993	72	80	3 OMGs & 1 AMG	Boonratana & Le, 1994; 1998b
Tat Ke Sector, Na Hang NR, Tuyen Quang Province	1998	13	16	1 OMG	Boonratana, 1999
Tat Ke Sector, Na Hang NR, Tuyen Quang Province	1999	c. 30		although observed, observer did not indicate actual numbers observed	Tinh in Nadler <i>et al.</i> , 2003
Tat Ke Sector, Na Hang NR, Tuyen Quang Province	2000	50			FPD Na Hang
Tat Ke Sector, Na Hang NR, Tuyen Quang Province	2001	40			FPD Na Hang
Tat Ke Sector, Na Hang NR, Tuyen Quang Province	2002	30			FPD Na Hang
Tat Ke Sector, Na Hang NR, Tuyen Quang Province	2004	40			Wolters, 2004
Tat Ke Sector, Na Hang NR, Tuyen Quang Province	2005	17	22		V.T. Quan & Ma V.T. (pers. comm., 2005)
Tat Ke Sector, Na Hang NR, Tuyen Quang Province	2005		100	information lacks verifiable evidence	Le Hong Binh (oral presentation at TQ workshop)
Ban Bung Sector, Na Hang NR, Tuyen Quang Province	1992	12	90 to 110	figures based on interviews	Ratajszczak <i>et al.</i> , 1992
Ban Bung Sector, Na Hang NR, Tuyen Quang Province	1993	23	50		Boonratana & Le, 1994; 1998b
Ban Bung Sector, Na Hang NR, Tuyen Quang Province	1996	4			Hill <i>et al.</i> , 1996
Ban Bung Sector, Na Hang NR, Tuyen Quang Province	1998	35			L.D. Dinh, pers. comm., in Boonratana, 1999
Ban Bung Sector, Na Hang NR, Tuyen Quang Province	1999		40 to 45		Dang & Nguyen, 1999

Site	Date	Maximum Observed	Estimated	Remarks	Source
Quang Province					
Ban Bung Sector, Na Hang NR, Tuyen Quang Province	2000	25			FPD Na Hang
Ban Bung Sector, Na Hang NR, Tuyen Quang Province	2001	23			FPD Na Hang
Ban Bung Sector, Na Hang NR, Tuyen Quang Province	2002	6			FPD Na Hang
Ban Bung Sector, Na Hang NR, Tuyen Quang Province	2005		50	information lacks verifiable evidence	Le Hong Binh (oral presentation at TQ workshop)
Cham Chu NR, Tuyen Quang Province	1992		20 to 40	figures based on interviews	Ratajszczak <i>et al.</i> , 1992
Cham Chu NR, Tuyen Quang Province	1999		22 to 25	figures based on interviews	Dang & Nguyen, 1999
Cham Chu NR, Tuyen Quang Province	2001	8	70		Long & Le, 2001
TSM Conservation Area, Ha Giang Province [Note: incorrectly reported as Du Gia NR]	2001		30 to 40	figures based on interviews	La & Trinh, 2001
TSM Conservation Area, Ha Giang Province [Note: incorrectly reported as Du Gia NR]	2002	c. 40	50 to 60	although observed, author did not indicate actual numbers observed	Le, 2002a
TSM Conservation Area, Ha Giang Province [Note: incorrectly reported as Du Gia NR]	2005	29	50 to 60	possibly 2-3 groups	Le Khac Quyet (oral presentation at TQ workshop)
TSM Conservation Area, Ha Giang Province	2006	81	90	8 OMGs	H.T. Dong, pers. comm., 2006
Tam Tao PNR, Bac Kan Province	2000		5 to 7	provisional record, figures based on interviews	Le & Simmons, 2002
Dong Phuc PNR, Bac Kan Province	2000		?	provisional record	D.T. Nong, pers. comm., in Nadler <i>et al.</i> , 2003
Nam Xuan Lac SHCA, Bac Kan Province	1999		18 to 20	provisional record, figures based on interviews	Dang & Nguyen, 1999
Nam Xuan Lac SHCA, Bac Kan Province	2002		4 to 5	provisional record, figures based on interviews	Bezuijen & Trinh, 2003

Site	Date	Maximum Observed	Estimated	Remarks	Source
Kim Hy PNR, Bac Kan Province	1998		?	provisional record	Geissmann & Vu, 1998
Yen Tu NR, Quang Ninh Province	2002		5 to 10	provisional record , figures based on interviews; stuffed animal in local resident's home	Le, 2002b
Duc Xuan Commune, Ha Giang Province	1999		8 to 10	provisional record, figures based on interviews	Dang & Nguyen, 1999
Na Chi Commune, Ha Giang Province	2001		10 to 20	provisional record, figures based on interviews	Le, 2001
Kien Thiet Forest, Tuyen Quang Province	1992		20 to 40	provisional record, figures based on interviews	Ratajszczak <i>et al.</i> , 1992
Tat Pet area, Bac Kan Province	1999		6	provisional record, figures based on interviews	Dang & Nguyen, 1999
Khuoi Muoc & Khuoi Chang areas, Bac Kan Province	1999		18 to 20	provisional record, figures based on interviews	Dang & Nguyen, 1999

NR = Nature Reserve; PNR = Proposed Nature Reserve; SHCA = Species/Habitat Conservation Area (a sub-category of Nature Reserve); OMG = One-male group; AMG = All-male group

4. RECOMMENDED CONSERVATION ACTIONS

This section presents and justifies the priority activities needed for, or to assist in the protection, management, and recovery of the Tonkin snub-nosed monkey populations and their habitats in Viet Nam. These recommended activities were developed from a series of consultations with the primary stakeholders and during a workshop held in Tuyen Quang (Annexes I & II). Summary of the recommended activities and the budget are presented in tables 4.1 and 4.2

4.1 Species and Habitat Protection Program

Site:	Na Hang NR, Cham Chu NR and TSM Conservation Area
Type of Action(s):	Management, Training, Monitoring
Phasing & Duration:	Phase I: 5 years Phase II: 5 years
Phasing & Budget:	Phase I: US\$500,000-600,000 Phase II: US\$550,000
Lead Agency:	FPD
Responsible Agencies:	FPD, Tuyen Quang and Ha Giang People's Committees, Tuyen Quang and Ha Giang FPDs, NR Management Boards, NGOs, stakeholder communities

Although provincial and national laws legally protect the Tonkin snub-nosed monkey and its habitats, yet hunting and habitat loss have continued unabated throughout its range. Since the species rediscovery, the Na Hang Nature Reserve in particular has seen several short and long-term projects that have had limited success for a range of reasons. Hunting pressure has apparently increased over the last few years and has apparently taken a significant toll on the Tonkin snub-nosed monkey populations. The need to impose stricter laws and heavier penalties for the illegal possession of protected species or their body parts, and the illegal possession of firearms should be seriously considered.

A high priority for immediate conservation action to prevent further decline of this critically endangered species is to establish well-trained protection teams to patrol the nature reserves against detrimental human activities and potential forest fires. The protection teams would need to focus on all routes into the nature reserves and into the prime habitats of the Tonkin snub-nosed monkeys. This would require establishing watchtowers, radio repeater stations, permanent and semi-permanent shelters for protection teams, establishing checkpoints that would be manned 24 hours a day, and establishing patrolling routes and protocol. In addition, the protection teams would need to be trained in wildlife laws, protected area rules and regulations, fire-fighting techniques, and in law enforcement activities using non-confrontational methods.

Experiences from protected areas in the tropics have shown that it takes one person to effectively patrol an area about 10 km². Thus, based on this assumption, the program would require ideally 42 persons to patrol and protect the Na Hang Nature Reserve and 58 persons for Cham Chu Nature Reserve. At the very least, these two reserves would respectively require 28 and 18 patrollers, based on the sizes of the strict protection areas of each reserve. In contrast, the TSM Conservation Area (Ha Giang Province) would require at least ten persons to patrol and protect the area. This is because the area is small, isolated, has a fragile ecosystem, and the terrain is difficult to traverse.

The human resources for patrolling can be drawn from the district FPDs and the communities living in and around the protected areas. Such joint patrolling teams would help foster better relationships among the stakeholders. In addition, local people's knowledge of the area, and of hunting techniques would be of immense use to the protection teams. Hiring local people would

provide them a secure source of income, and they often become staunch advocates for the protection of species and their habitats.

There is also a need for an officer each for Na Hang and Cham Chu Nature Reserves, and the TSM Conservation Area to backstop the protection teams. These officers would need to be experienced, have at least a first degree in the natural sciences or related subjects, knowledgeable in the relevant wildlife laws and protected area rules and regulations, and proficient with enforcement procedures. An experienced national project manager with postgraduate qualifications in a related field is also needed to provide the overall project leadership and to ensure project accountability. In addition, a series of short-term expert input are likely needed to establish patrolling protocols and to train the personnel in effective patrolling, and in recording and reporting human activities accurately. The international expert for the long-term monitoring program (see section 4.2) could be requested to provide additional input.

Some of the equipment required to implement this program will include motorcycles, engine-powered boats, two-way radio communication, GPS units, fire-fighting equipment, and basic field gear. The protection program is estimated to cost between US\$500,000 to US\$600,000 for the first phase, and US\$550,000 for the second phase to cover infrastructure, equipment, operational costs and salaries.

4.2 Long-term Monitoring Program

Site:	Na Hang NR, Cham Chu NR and TSM Conservation Area
Type of Action(s):	Monitoring, Research, Management
Phasing & Duration:	Phase I: 5 years Phase II: 5 years
Phasing & Budget:	Phase I: US\$500,000-750,000 Phase II: US\$600,000
Lead Agency:	IEBR
Responsible Agencies:	IEBR, FPD, Tuyen Quang and Ha Giang People's Committees, Tuyen Quang and Ha Giang FPDs, NR Management Boards, NGOs, stakeholder communities

To date, there is no established mechanism to monitor changes to the Tonkin snub-nosed monkey populations and their habitats. Currently available information has been gathered sporadically and some could not even be verified. Hence, monitoring is needed to identify major patterns of abundance, distribution and movements of key species; to evaluate effectiveness of protection; to identify areas of conservation concern (e.g., zones of high human impact or faunal concentrations); and to provide a basis for monitoring ecological changes and patterns of human use. Monitoring provides essential data for making wise management decisions – allowing quick identification of, and appropriate response to management problems.

Hence, a centrally coordinated long-term monitoring program covering Na Hang and Cham Chu Nature Reserves, and the TSM Conservation Area is a high priority recommendation for conservation action in this Action Plan. Although coordinated centrally, duplicate databases should be made available in the respective provinces. The monitoring program should be carried out as long as the Tonkin snub-nosed monkeys remain globally threatened. In addition, upon confirmation of the Tonkin snub-nosed monkeys' presence in other areas, the monitoring program should be extended to those areas. The monitoring program would have to be made simple for understanding and implementation, but based on a sound standardized format for scientific analysis and qualitative interpretation.

The monitoring program would therefore require 28 persons for Na Hang Nature Reserve, 18 for Cham Chu Nature Reserve, and ten for the TSM Conservation Area. Monitoring teams would need to be fully trained and well equipped to ensure accurate data are gathered. By default, FPD

rangers should be assigned the tasks of monitoring, but they are often committed to other duties. However, should FPD rangers become available, then they must be free from all other duties and devote their time fully to the monitoring activities. Thus, monitoring teams can and should include individuals from the communities living in and around the protected areas. Local people will add value to the program with their local ecological knowledge. In addition, the monitoring program can be carried out alongside routine protection activities (see section 4.1), or the same human resource can be used for both activities. Thus, the proposed budget of this activity will need to be increased by about 30% to cover both protection and monitoring activities and related infrastructure and equipment.

The successful patrolling and monitoring by stakeholder communities in the Nakai-Nam Theun National Protected Area in Lao PDR (Boonratana, 2001; 2002; 2003) has resulted in its concept being adopted and expanded in the Social and Environment Management Framework and 1st Operational Plan of the NT2-WMPA (2005).

In addition, there has to be one monitoring officer for every Tonkin snub-nosed monkey population, whose main tasks are to support, strengthen, and facilitate the monitoring teams, and to verify, sort and compile the data gathered by the monitoring teams. Thus, two officers should be assigned to Na Hang Nature Reserve (Tat Ke and Ban Bung Sectors), and one each to Cham Chu Nature Reserve and the TSM Conservation Area. These officers would need to have at least a first degree in the natural sciences or related subjects, have field experience, and be computer-literate. Preference should be given to candidates from the provinces with Tonkin snub-nosed monkey populations.

A program officer/manager must also be recruited whose main tasks are to oversee the program's activities, train and develop the capacity of monitoring teams and officers, manage and interpret data, make appropriate advise to the protected area managers and district/provincial FPDs. The officer would need to have a post-graduate degree in the natural sciences or related subjects; be proficient in database management, GIS, and Excel; and has experience working in the field.

As the required level of competence to fulfil the ascribed tasks are lacking, therefore the services of an internationally-recruited expert should be acquired full-time for the first two years, and for six person-months for the following three years. The expert's tasks would include training and developing capacities of all personnel; establishing monitoring routes and protocols; developing data recording and entry formats; supervise data management, analysis and interpretation; and provide overall leadership to the program. In the fifth year, the expert is expected to review the program, identify its strengths and weaknesses; make recommendations to address those weaknesses, and develop a proposal for its continuation.

Some of the infrastructure and equipment required to implement this program will include a central coordinating office, computers (and peripherals), transport, GPS units, and basic field gear. The first five years of the monitoring program is estimated to cost between US\$500,000 to US\$750,000 to cover infrastructure, equipment, operational costs and salaries.

4.3 Long-term Field Studies on Behavioral Ecology

Site:	Na Hang NR, Cham Chu NR and TSM Conservation Area
Type of Action(s):	Research, Management
Duration:	10 years
Budget:	US\$600,000-800,000
Lead Agency:	IEBR
Responsible Agencies:	FPD, IEBR, Forestry University of Viet Nam, Viet Nam National University (Hanoi), NR Management Boards

Long-term primate studies broaden our knowledge of little known taxa, providing insights into the dynamics of primate societies. In addition, they provide data for evaluating trends, for predicting behavioral strategies, and for testing hypotheses on behavioral adaptations. Importantly, information obtained will assist in formulating management plans for species conservation, and in strengthening management plans for protected areas. Furthermore, it has been shown that long-term studies and scientific presence have had significant impact on protected area establishment and/or extension, and have frequently deterred poaching and habitat encroachment.

It was not until a six-month field study on the behavior and ecology of the Tonkin snub-nosed monkey in the Na Hang Nature Reserve in 1993 (Boonratana & Le, 1994; 1998a; 1998b) that some information on this rare species was made available (see section 2). In addition, the study resulted in a decree issued by the Tuyen Quang Provincial People's Committee establishing a provincial-level nature reserve in Na Hang, specifically to protect the Tonkin snub-nosed monkeys and their habitats (Boonratana & Le, 1998b).

Ongoing studies in the Na Hang Nature Reserve and the TSM Conservation Area are expected to yield additional information on its behavior and ecology, which will likely have significant implications to the management of the species and their habitats. These studies, culminating into a higher degree usually last no longer than two years. Thus, efforts must be made to encourage a continuous supply of primate researchers at all known Tonkin snub-nosed monkey sites, with subsequent studies building up on the foundations laid down by earlier ones.

The FPD of Tuyen Quang and Ha Giang should consider appointing full-time scientific officers, who will ensure better coordination and integration of management and research activities, and help the management authorities to refine research priorities. In addition, the scientific officers should assist in coordinating visiting researchers, encouraging study on topics important for management, and ensuring that biodiversity values are not compromised.

The cost for conducting a long-term scientific study on the behavioral ecology of the Tonkin snub-nosed monkey at each site is estimated to cost between US\$15,000 to US\$20,000 for each year of field activities.

4.4 Surveys for Tonkin Snub-nosed Monkeys

Site:	Cham Chu NR, Du Gia NR, Dong Phuc PNR, Kim Hy PNR, Tam Tao PNR, Nam Xuan Lac SHCA, Than Xa-Phuong Hoang PNR, Bac Me PNR and Kim Binh PNR
Type of Action(s):	Survey, Management
Duration:	2 years
Budget:	US\$55,000-82,500
Lead Agency:	FPD
Responsible Agencies:	FPD, IEBR, Forestry University of Viet Nam, Viet Nam National University (Hanoi), Bac Kan, Thai Nguyen, Tuyen Quang and Ha Giang FPDs, NR Management Boards, NGOs

Several primate surveys have been carried out throughout many parts of the Tonkin snub-nosed monkeys' historical range, and these have resulted with new and significant findings – confirmed sightings at a few sites and their possible occurrence at a number of other previously unreported sites. Consistent secondary information indicates the likely presence of the Tonkin snub-nosed monkeys at some of the provisionally recorded sites (figure 3.1). Thus, there is an urgent need to survey these areas before the Tonkin snub-nosed monkey populations decline any further, or become extirpated if they should exist in those areas.

In addition, Cham Chu Nature Reserve might possibly hold a population larger than suspected because of its size, and because the difficult terrain might be a deterrent to many hunters. However,

given that there is no report of the Tonkin snub-nosed monkeys from Cham Chu Nature Reserve in recent years, therefore there is a need to determine its status there. Likewise, as the Du Gia Nature Reserve is located close to the TSM Conservation Area, therefore there is a very strong possibility that the Tonkin snub-nosed monkey might be present there. Thus, the Du Gia Nature Reserve should top the list for conducting primate surveys focussing on the Tonkin snub-nosed monkeys.

Given that these areas are difficult to access and that these monkeys are rare and wide-ranging, therefore experienced field primatologists would be required to conduct the surveys. In addition, qualified surveys based on sound scientific methodologies will yield better information about their population and group sizes, age-sex composition and habitat use. These basic information are essential towards establishing new protected areas or extending existing ones, and towards improving or demarcating protected area boundaries and management zones.

Depending on access and size of the areas, the surveys are expected to take between one to three months in each area. The estimated costs for conducting a professional survey for the Tonkin snub-nosed monkeys would require between US\$5,000 to US\$7,500 per month per site to cover transport, supplies, fees, and local guides.

4.5 Expanding Protected Habitats Available to the Tonkin Snub-nosed Monkeys

Site:	Na Hang NR, Cham Chu NR, and TSM Conservation Area (or Du Gia NR)
Type of Action(s):	Reforestation, Management
Duration:	10 years
Budget:	US\$300,000-400,000
Lead Agency:	FPD
Responsible Agencies:	FPD, Tuyen Quang and Ha Giang People's Committees, IEBR, Tuyen Quang and Ha Giang FPDs, NR Management Boards

Expansion of protected habitats here include: drawing up a proposal to legally designate the TSM Conservation Area as a Species/Habitat Conservation Area; establishing new protected areas should new Tonkin snub-nosed monkey populations be discovered; making extensions to existing protected areas with Tonkin snub-nosed monkey populations if necessary; establishing protected land corridors between existing protected areas with Tonkin snub-nosed monkey populations, if feasible; and reforestation of degraded habitats within protected areas with Tonkin snub-nosed monkey populations.

Establishment of new protected areas and the extension of existing ones are essential in ensuring the long-term survival of Tonkin snub-nosed monkey populations, particularly if existing protected areas do not adequately address their protection and conservation needs. However, establishing new protected areas or extending existing ones must be based upon sound scientific information obtained through tested survey techniques (see section 4.4) and long-term field research (see section 4.3), ensuring that areas are well demarcated and biodiversity needs are addressed. Linking protected areas or proposed protected areas should closely be linked to recommended conservation action 4.4.

Reforestation activities in Ha Hang and Cham Chu Nature Reserves, and the TSM Conservation Area should avoid the conventional plantation forestry comprising single and/or introduced species approach. Natural forest ecosystems are complex, but nature has great powers of regeneration. Thus, the correct approach to forest restoration is to accelerate natural forest regeneration by increasing tree density and species diversity, and by encouraging the dispersal of seeds (FORRU, 1998). This can be brought about by carefully planting selected species to the already existing seedling community. The selected species should be those that grow rapidly, shade out weeds, attract seed-dispersing wildlife, and are known food plant species of Tonkin snub-nosed monkeys.

Reforestation would require collection of seedlings, establishing and maintaining nurseries, and planting saplings. Members of the local communities should be employed to fulfil these activities. Thus, it is expected that each site would require 5-6 workers, and a supervisor with the appropriate qualifications and experience. The estimated costs for reforestation in the three nature reserves would require between US\$7,500 to US\$10,000 per annum per site, to cover basic gardening equipment and materials, and salaries.

4.6 Strengthening Protected Area Management

Site:	Na Hang NR, Cham Chu NR and TSM Conservation Area
Type of Action(s):	Management, Training
Phasing & Duration:	Phase I: 3 years Phase II: 7 years
Phasing & Budget:	Phase I: US\$45,000-60,000 Phase II: US\$55,000-70,000
Lead Agency:	FPD
Responsible Agencies:	FPD, IEBR, Tuyen Quang and Ha Giang FPDs, NR Management Boards, NGOs

The foremost priority for strengthening protected area management in Na Hang and Cham Chu Nature Reserves, and the TSM Conservation Area is to establish management boards for the nature reserves as none currently exist. Hence, tasks for managing the nature reserves to date have been undertaken by the relevant district FPDs. However, most FPD staff are trained in traditional forestry, therefore lacking the necessary knowledge and skills in natural resource and ecosystem management, and in biodiversity conservation.

Of equal importance is to staff the respective nature reserve with competent individuals. The *Competence Standards for Protected Area Jobs in South East Asia* (Appelton *et al.*, 2003) which has been adopted by ASEAN as guidelines, should be used for defining functions and job descriptions. However, given that it is often not possible to recruit competent individuals for all positions, therefore nature reserve staff will have to be equipped with knowledge and skills relevant to their job descriptions. Training and capacity development programs and activities will need to be part of their professional development for effective management of the nature reserves. In addition, capacity development efforts at Na Hang and Cham Chu Nature Reserves, and the TSM Conservation Area should address the need for capacity development at the individual and the institutional level. Thus, the *Competence Standards for Protected Area Jobs in South East Asia* (Appelton *et al.*, 2003) should again be referred to, for developing a more performance-based focus for training and development, and for designing training needs assessments, training strategies and programs. Furthermore, the competence standards could also be used for developing, delivering and assessing in-service training.

Clear demarcation of the boundaries and management zones are likewise, integral components of strengthening the protected area management.

The estimated costs for developing and conducting in-service training programs for staff of the three areas would require between US\$7,500 to US\$10,000 per two-week program for 15 persons. It is recommended that this activity be conducted at least twice a year for the first three years, and at least once a year for the following years.

4.7 Public Awareness and Conservation Education

Site:	Na Hang NR, Cham Chu NR and TSM Conservation Area
Type of Action(s):	Conservation Education, Management
Phasing & Duration:	Phase I: 5 years Phase II: 5 years
Phasing & Budget:	Phase I: US\$100,000 Phase II: US\$110,000
Lead Agency:	FPD
Responsible Agencies:	FPD, IEBR, Viet Nam National University (Hanoi), Forestry University of Viet Nam, Tuyen Quang and Ha Giang People's Committees, NR Management Boards, NGOs

Increasing awareness and educating the public on wildlife laws, protected area rules and regulations, and conservation issues will be, in the long-term, an essential step towards bringing about public understanding and support. After all, conservation is primarily about a change in attitude. However, awareness campaigns and education programs must be carefully tailored to suit the target audiences, which can comprise urban to rural to ethnic communities. Furthermore, the materials and programs should be culturally sensitive, relevant, and simple to comprehend. Hence “specific interventions focussing on the concepts of extinction...” as recommended by Geissmann *et al.* (2000) and Nadler *et al.* (2003) might not be appropriate for most rural audience, whose main concern is to sustain themselves from day-to-day. Instead, highlighting the values of maintaining biodiversity and the ecological services they provide, and the wise management of natural resources toward sustaining and enhancing their livelihoods is likely to be more relevant and achieve the desired effect.

Awareness materials should not be limited to glossy posters only, but should include the use of media. Video, television and radio programs have been recognized as powerful tools, with the ability to reach millions of people, including those communities living in remote areas. Short one minute radio broadcasts over local radio stations several times a day is likely to have the intended impact over time. The use of mobile theaters enacting plays based on conservation themes would likely be a popular and effective tool for conservation education and awareness, especially for schools and communities in or close to the Tonkin snub-nosed monkey's habitats. The services of public figures – successful entrepreneurs, athletes, singers, actors and actresses known to local communities – should be engaged to convey conservation messages.

The cost for conducting conservation education and awareness activities (transport, DVD players, projectors, etc.), and producing relevant materials throughout the Tonkin snub-nosed monkey range is estimated to cost about US\$20,000 per annum.

4.8 Participation of Stakeholder Communities

Site:	Ha Giang, Tuyen Quang, and Bac Kan Provinces
Type of Action(s):	Management
Duration:	Unlimited
Budget:	None required
Lead Agency:	Ha Giang, Tuyen Quang, and Bac Kan People's Committees
Responsible Agencies:	Ha Giang, Tuyen Quang, and Bac Kan People's Committees, FPD, IEBR, Viet Nam National University (Hanoi), Forestry University of Viet Nam, Ha Giang, Tuyen Quang, and Bac Kan FPDs, NR Management Boards, NGOs

Conservation awareness and education activities may allow the public and communities to better appreciate the values of biodiversity conservation and natural resources management, but it is important to understand that awareness and education programs will be of little value if socioeconomic standards remain low. This is particularly the case for a large majority of the human population throughout the Tonkin snub-nosed monkey's range. Their limited options to generate income, and low, declining agricultural productivity have resulted in an unsustainable exploitation of forest resources.

Hence, conservation programs or development projects throughout the Tonkin snub-nosed monkey's range should benefit local communities through their participation, and/or through economic incentives. Local rules and regulations with respect to the protection and sustainable use of natural resources could be developed for the participating communities in exchange for employment, or for development and livelihood improvement benefits. Likewise, large development projects implemented close to the protected areas should include a clause in their employees' contracts that requires employees to respect relevant laws on species and habitat protection, and not to partake in activities contradictory to the objectives of the protected areas.

Developing and/or integrating conservation into development programs or vice-versa usually requires time, effort and resources. However, a quicker and effective way is to provide employment to members of the stakeholder communities as members of the protection teams, as members of the monitoring teams, as field assistants on long-term studies, and as employees of the nature reserves. Thus, the recommended activities 4.1 to 4.6 above should benefit local communities through their participation, and likewise the recommended activities would benefit from the local communities' knowledge and skills. There are numerous examples globally of local communities becoming strongest supporters of biodiversity conservation through their active participation in conservation activities.

Participation of stakeholder communities to the recommended activities would require no additional budget.

4.9 Relocation of Stakeholder Communities

Although not advocated by the compilers of this Action Plan, the recommendation by Na Hang and Tuyen Quang FPDs, and by Nadler *et al.* (2003), to relocate some settlements from the Na Hang Nature Reserve is nevertheless included here. Le Hong Binh reported during the TQ workshop that the nature reserve is free from any human-related threats or pressures, and that the Tonkin snub-nosed monkey population has in fact increased. Hence, it is not clear why those settlements require to be relocated if they have no impact on the Tonkin snub-nosed monkey population and habitats.

Uncertainty of relocation of a particular village in Lao PDR has resulted in a deterioration of community management systems and health (R. Boonratana, pers. obs., 2004). Residents of the said village no longer paid attention to improving agricultural productivity, repairing fences that used to keep livestock outside the residential area, proper disposal of human waste, and managing their natural resources. Furthermore, the Na Hang Nature Reserve might face difficulties in securing international financial assistance for conservation activities in the area, should the strategy for strengthening protected area management include relocation of settlements.

Nevertheless, the compilers can only recommend that relocation be considered as the last option only if all attempts to involve the communities or to win their support fail. In addition, the compilers recommend that all safeguards in relation to resettlement be fully satisfied before attempting to relocate the settlements.

4.10 Implementation of Recommendations

In addition to the conservation activities above, additional recommendations with respect to the implementation of the activities were made during consultations and at the TQ workshop, primarily to ensure maximum output for any investment made. These included:

- ensuring that senior personnel and experts acquired to implement activities 4.1 and 4.2 fulfil the qualifications and requirements for the respective job descriptions;
- ensuring that researchers or their supervisors have the relevant academic background and research experience to implement activity 4.3, and that progress be evaluated every quarterly;
- ensuring that opportunities are available for national graduate/postgraduate students to join activity 4.3 as junior counterparts, should research be carried out by non-nationals;
- ensuring that field workers wanting to implement activity 4.4 have the minimum relevant background and experience;
- ensuring that reforestation under activity 4.5 use only seedlings from the original floral community;
- ensuring staff assigned to the nature reserves under activity 4.6 fulfil (or have the potential to fulfil) the qualifications and requirements for the respective job descriptions;
- ensuring that all activities, where feasible, provide employment opportunities to local communities living in and around the protected areas;
- ensuring that no Tonkin snub-nosed monkeys are captured for any purpose including scientific research, captive breeding, and translocation until there is complete understanding of their ecology, behavior and population dynamics;
- making random checks on restaurants to ensure no illegally obtained wildlife meat or other products are for sale;
- evaluating success of activities at regular intervals based on well-defined criteria that could include an increase in Tonkin snub-nosed monkey numbers observed, an increase in natural habitats available to the Tonkin snub-nosed monkeys, a reduction in the hunting and trapping incidences in the Tonkin snub-nosed monkey habitats, etc. These evaluations, must, however be supported by verifiable monitoring evidence.
- seeking financial assistance from EVN to fund conservation and protection activities in the Na Hang Nature Reserve and in the Gam watershed area;
- obtaining support from EVN to include a clause in their employees' contracts that will require the employees' termination should they be found indulging in activities contradictory to wildlife laws, and protected area rules and regulations;
- establishing a Technical Advisory Group comprising representatives from the stakeholder agencies and communities, and national scientific institutions, to look into all matters relevant to the Tonkin snub-nosed monkeys;
- seeking the assistance of SEAPA to review research or project proposals on any aspect of the Tonkin snub-nosed monkeys, and to the proposed Technical Advisory Group;
- requesting donor agencies to provide independent supervisory missions to major donor-funded activities to monitor and evaluate progress made, and to assist in resolving issues (if any);
- reviewing inputs and outputs to all recommended actions and activities in the fifth year of implementation, to provide better directions for the remaining five years.

Table 4.1: Summary of recommended activities

Activities	Phase I	Phase II	Type of Actions	Lead Agency	Responsible Agencies
4.1 Species and Habitat Protection Program	5 years	5 years	Management, Training, Monitoring	FPD	FPD, Tuyen Quang and Ha Giang People's Committees, Tuyen Quang and Ha Giang FPDs, NR Management Boards, NGOs, stakeholder communities
	US\$500,000-600,000	US\$550,000			
4.2 Long-term Monitoring Program	5 years	5 years	Monitoring, Research, Management	IEBR	IEBR, FPD, Tuyen Quang and Ha Giang People's Committees, Tuyen Quang and Ha Giang FPDs, NR Management Boards, NGOs, stakeholder communities
	US\$500,000-750,000	US\$600,000			
4.3 Long-term Field Studies on Behavioral Ecology	10 years		Research, Management	IEBR	FPD, IEBR, Forestry University of Viet Nam, Viet Nam National University (Hanoi), NR Management Boards
	US\$600,000-800,000				
4.4 Surveys for Tonkin snub-nosed Monkeys	2 years		Survey, Management	FPD	FPD, IEBR, Forestry University of Viet Nam, Viet Nam National University (Hanoi), Bac Kan, Thai Nguyen, Tuyen Quang and Ha Giang FPDs, NR Management Boards, NGOs
	US\$55,000-82,500				
4.5 Expanding Protected Habitats Available to the Tonkin Snub-nosed Monkeys	10 years		Reforestation, Management	FPD	FPD, Tuyen Quang and Ha Giang People's Committees, IEBR, Tuyen Quang and Ha Giang FPDs, NR Management Boards
	US\$300,000-400,000				
4.6 Strengthening Protected Area Management	3 years	7 years	Management, Training	FPD	FPD, IEBR, Tuyen Quang and Ha Giang FPDs, NR Management Boards, NGOs
	US\$45,000-60,000	US\$55,000-70,000			
4.7 Public Awareness and Conservation Education	5 years	5 years	Conservation Education, Management	FPD	FPD, IEBR, Viet Nam National University (Hanoi), Forestry University of Viet Nam, Tuyen Quang and Ha Giang People's Committees, NR Management Boards, NGOs
	US\$100,000	US\$110,000			
4.8 Participation of Stakeholder Communities	Unlimited		Management	Ha Giang, Tuyen Quang, and Bac Kan People's Committees	Ha Giang, Tuyen Quang, and Bac Kan People's Committees, FPD, IEBR, Viet Nam National University (Hanoi), Forestry University of Viet Nam, Ha Giang, Tuyen Quang, and Bac Kan FPDs, NR Management Boards, NGOs
	None required				

Activities	Phase I	Phase II	Type of Actions	Lead Agency	Responsible Agencies
4.9 Relocation of Stakeholder Communities	see text				
4.10 Implementation of Recommendations	Every 6 months		Monitoring, Evaluation	FPD	FPD, IEBR, Forestry University of Viet Nam, Viet Nam National University (Hanoi), Tuyen Quang and Ha Giang People's Committees, Tuyen Quang and Ha Giang FPDs, NR Management Boards, NGOs

Table 4.2: Summary of budget requirements**I. Proposed budget:**

Activity	Phasing	Duration	Budget (in US\$)
4.1: Species and Habitat Protection Program	Phase I	5 years	500,000 – 600,000
	Phase II	5 years	550,000
4.2: Long-term Monitoring Program	Phase I	5 years	500,000 – 750,000
	Phase II	5 years	600,000
4.3: Long-term Field Studies on Behavioral Ecology		10 years	600,000 – 800,000
4.4: Surveys for Tonkin snub-nosed Monkeys		2 years	55,000 – 82,500
4.5: Expanding Protected Habitats Available to the Tonkin Snub-nosed Monkeys		10 years	300,000 – 400,000
4.6: Strengthening Protected Area Management	Phase I	3 years	45,000 – 60,000
	Phase II	7 years	55,000 – 70,000
4.7: Public Awareness and Conservation Education	Phase I	5 years	100,000
	Phase II	5 years	110,000
TOTAL		10 years	3,415,000 – 4,122,500

II. Alternate budget:

Activity	Phasing	Duration	Budget (in US\$)
4.1 & 4.2: Species and Habitat Protection Program & Long-term Monitoring Program	Phase I	5 years	650,000-975,000
	Phase II	5 years	780,000
4.3: Long-term Field Studies on Behavioral Ecology		10 years	600,000 – 800,000
4.4: Surveys for Tonkin snub-nosed Monkeys		2 years	55,000 – 82,500
4.5: Expanding Protected Habitats Available to the Tonkin Snub-nosed Monkeys		10 years	300,000 – 400,000
4.6: Strengthening Protected Area Management	Phase I	3 years	45,000 – 60,000
	Phase II	7 years	55,000 – 70,000
4.7: Public Awareness and Conservation Education	Phase I	5 years	100,000
	Phase II	5 years	110,000
TOTAL		10 years	2,695,000 – 3,377,500

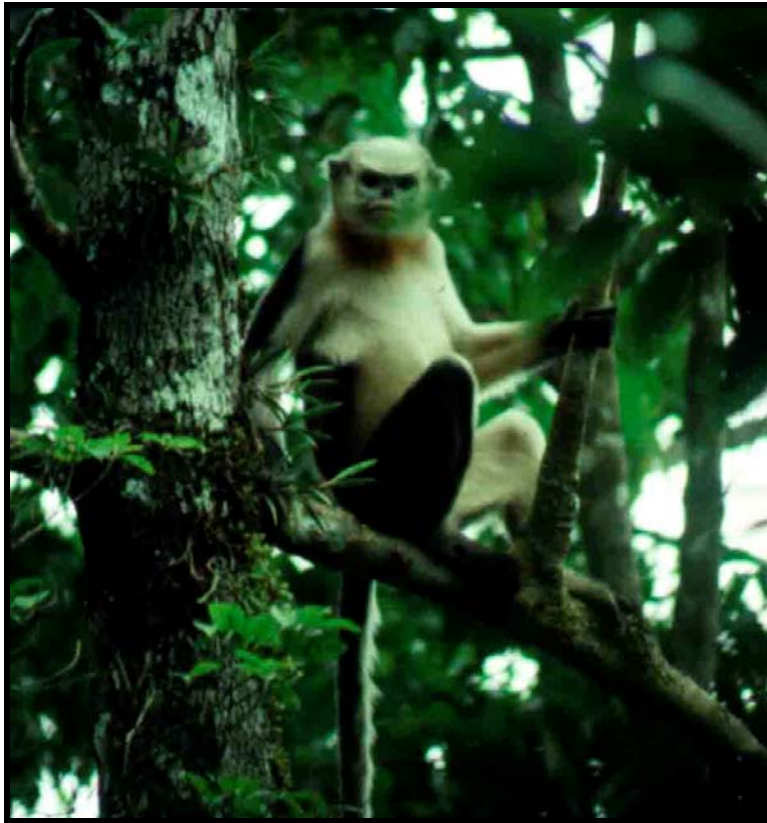
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Sub-adult male © Ramesh Boonratana

Annex I: List of workshop participants [Tuyen Quang, Jul. 25th, 2005]

Name	Agency/Institution
Mr. Vuong Tien Manh	Central FPD, Hanoi
Mr. Do Van Toan	Director, Tuyen Quang Provincial FPD
Mr. Pham Hong Luu	Tuyen Quang Provincial FPD
Mr. Tran Quang Khoi	Tuyen Quang Provincial FPD
Mr. Le Ngoc Van	Tuyen Quang Provincial FPD
Mr. Nguyen Ba Kiem	Tuyen Quang Provincial FPD
Mr. Hoang Van Ninh	Vice-Director, Ha Giang Provincial FPD
Mr. Dam Van Tue	Ha Giang Provincial FPD
Mr. Ha Phuc Thiet	Vice-Director, Chiem Hoa District FPD
Mr. Lam Phuc Huan	Chiem Hoa District FPD
Mr. Dang Van Tinh	Vice-Director, Ham Yen District FPD
Mr. Ma The Hai	Ham Yen District FPD
Mr. Le Hong Binh	Acting Director, Na Hang District FPD
Mr. Le Trong Truong	Na Hang District FPD
Prof. Dr. Dang Huy Huynh	Director, Center for Biodiversity Conservation
Dr. Nguyen Ba Thu	Vice-Director, Center for Biodiversity Conservation
Mr. Le Khac Quyet	Primate Researcher, Fauna & Flora International
Mr. Dong Thanh Hai	Primate Researcher, Australian National University
Ms. Dinh Mai Huong	Tuyen Quang TV and Radio Agency
Mr. Nguyen Ngoc Toan	Vice-Director, Tuyen Quang TV and Radio Agency
Ms. Bettina Martin	Forest Conservation Advisor, Center for Biodiversity Conservation
Mr. Fernando Potess	President Director, PRCF
Mr. Ngo Sy Hoai	International Cooperation Department, MARD
Mr. Ta Van Toan	Viet Nam News Agency
Assoc. Prof. Dr. Le Xuan Canh	Director, IEBR; Vice-President for Research and Conservation, SEAPA; & IUCN/SSC Primate Specialist Group
Dr. Ramesh Boonratana	Secretary-General, SEAPA; & IUCN/SSC Primate Specialist Group
Mr. Ha Quy Quynh	Resource person, IEBR
Mr. Dang Huy Phuong	Resource person, IEBR
Mr. Nguyen Truong Son	Resource person, IEBR
Mr. Nguyen Quang Truong	Resource person, IEBR

Annex II: Summarized workshop recommendations [Tuyen Quang, Jul. 25th, 2005]

Compilers' note: Recommendations below were summarized from individual oral presentations and from group discussions made during the workshop, and do not necessarily represent the collective opinions of the workshop's participants.

1. Further Studies

- Conduct additional studies on the population sizes and distributions of the Tonkin snub-nosed monkeys in Cham Chu and Na Hang Nature Reserves.
- Extend studies to include other areas within known past distributions of the Tonkin snub-nosed monkeys (e.g., Vo Nhai in Thai Nguyen Province, Yen Tu mountains in Bac Giang Province and Ban Thi area in Bac Kan Province).
- Develop a long-term monitoring program for the Tonkin snub-nosed monkeys and other primate species in protected areas such as Du Gia, Na Hang, and Cham Chu Nature Reserves.
- Conduct field studies surveys on the ecology and biology of the Tonkin snub-nosed monkeys in Tuyen Quang and Ha Giang Provinces.
- Conduct feasibility studies to look into the establishment of green corridors and potential habitat extensions for the Tonkin snub-nosed monkeys and other wildlife species.
- Gather information and develop a database for the Tonkin snub-nosed monkeys at national and international levels.

2. Management Strategies

- Urgently establish management boards for Na Hang and Cham Chu Nature Reserves.
- Develop community-based natural resource management for small protected areas such as Du Gia Nature Reserve.
- Improve collaboration and cooperation amongst various local management agencies (e.g., local government, forest protection branch, army, agriculture and rural development, police, etc.), research institutions, NGOs and local communities on resource use planning and management.
- Increase manpower (forest rangers and patrollers) for Na Hang, Cham Chu, and Du Gia Nature Reserves.
- Develop plans for demarcating the boundaries and the management zones of the nature reserves.
- Mitigate human impacts through: relocation of enclave villages/settlements, curbing illegal activities (e.g., wildlife hunting, wildlife trade control, illegal logging, land encroachment, non-timber forest product collection), curbing forest fires, and collection of hunting guns.
- Improve enforcement activities, especially around the boundaries of the nature reserves.
- Encourage the participation of stakeholder communities in conservation activities, and develop opportunities for them to benefit from these programs/projects.
- Establish a national Technical Advisory Group for the conservation of the Tonkin snub-nosed monkeys in Viet Nam, to comprise key individuals from the relevant management agencies, scientific institutions and the local communities.

3. Training and Awareness Programs

- Strengthen capacity of nature reserve managers.
- Strengthen capacity of forest rangers and patrollers.
- Develop conservation awareness programs for different target groups (e.g., managers, decision-makers, local communities, etc.).
- Provide training on monitoring, data collection and database management.

4. Financing

- Develop short-term and long-term projects to raise funds for research, conservation and livelihood improvement.

- Seek funds from national and international agencies to support activities (patrolling, guard posts, equipment) for the conservation of Tonkin snub-nosed monkeys.
- Seek funds from the Government of Viet Nam to relocate enclave villages/settlements from Na Hang Nature Reserve.
- Seek funds from Government of Viet Nam and international agencies to various conservation and livelihood improvement.
- Seek funds from national and international agencies for developing awareness materials, and for implementing awareness programs.



Young juveniles © Ramesh Boonratana