

The critical status of the Delacour's langur (*Trachypithecus delacouri*) and the call for a National Action Plan

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Summary

The Delacour's langur (*Trachypithecus delacouri*) is one of the three primate species endemic to Vietnam, and listed as 'Critically Endangered' (IUCN 2015). In addition, this species has been continuously included in the biennial list of "The World's 25 Most Endangered Primates" (Mittermeier et al. 2000; 2012), since the lists inception in 2000.

For an assessment of the current status of the species, 20 surveys were carried out in all nine areas where populations of the species remain.

The results of the surveys show a similar pattern to surveys undertaken over the last decade: a continued dramatic decrease in many subpopulations due to poaching. Only the population at Van Long Nature Reserve is the exception, growing steadily following a complete hunting ban supported by a community based protection unit, and intensive work by the Management Board. Van Long Nature Reserve has high awareness and support in the surrounding communes as a result of a 15 year long conservation project supported by Frankfurt Zoological Society.

The surveys showed that eight subpopulations of the Delacour's langur have been eradicated during the last decade.

From data gathered during the latest surveys, the current total population is now estimated at 234-275 individuals in 8 subpopulations. The two largest populations occur in Van Long Nature Reserve and in a planned extension area of the reserve.

As the reserve and the planned extension area are administrated by two separate provincial authorities, the langurs occurring here have been identified as occurring in two separate populations; however they do in fact form one population.

All other subpopulations surveyed are already too small to survive long-term.

Thus the most important conservation action for the species would be the extension of Van Long Nature Reserve. The size of the extended nature reserve and the existing habitat conditions could support a large viable population.

An improvement of protection for all subpopulations outside Van Long Nature Reserve in order to secure their survival is not feasible, due to the lack of adequate protection or political will to improve protection.

The translocation of groups or individuals from very small populations is also not a feasible option. Translocation requires a very high personal resource, technical and financial investment has little proven success and would need to be undertaken in areas with very difficult access and terrain.

The Endangered Primate Rescue Center runs a successful captive breeding program for the species. The goal is the reintroduction of captive bred animals into a safe habitat. A pilot project has already been successfully undertaken by the EPRC, with the first reintroduction of captive bred individuals into Van Long Nature Reserve. The establishment of a second viable population of the species would be a priority for conservation. There also exists a possibility for another reintroduction into the recently established World Heritage Site "Trang An Scenic Landscape Complex" in Ninh Binh Province.

These surveys showed that the priority for a conservation intervention should be the extension of Van Long Nature Reserve and a feasibility study for the reintroduction of captive bred individuals

into the “Trang An Scenic Landscape Complex”, thus establishing a second population in an area with higher protection.

Conservation activities for the species are recommended, and the development of a National Action Plan for one of the Vietnamese endemic primate species would provide the basis to support the survival of the species.

A further decrease of the number of individuals with extinction in foreseeable future would be a depressing shame for the country and a great and irrecoverable loss for the world.

Tình trạng nguy cấp của loài Voọc Mông Trắng (*Trachypithecus delacouri*) và sự cần thiết của một kế hoạch hành động bảo tồn cấp quốc gia

Tóm tắt

Voọc Mông trắng (*Trachypithecus delacouri*) là một trong ba loài linh trưởng đặc hữu của Việt Nam, loài này được liệt vào danh sách những loài cực kỳ nguy cấp của IUCN (2015). Từ năm 2000, loài liên tục nằm trong danh sách “25 loài linh trưởng nguy cấp nhất thế giới” (Mittermeier và cộng sự 2000; 2012). Nhằm đánh giá hiện trạng bảo tồn, 20 đợt khảo sát thực địa tại 9 điểm phân bố đã được thực hiện. Kết quả cho thấy các tiểu quần thể suy giảm nhanh do săn bắn, bẫy bắt. Ngoại trừ quần thể ở Khu bảo tồn thiên nhiên đất ngập nước Vân Long có số lượng tăng trưởng ổn định. Quần thể ở Vân Long phát triển ổn định do việc thực thi pháp luật khá tốt với sự hỗ trợ của đội ngũ nhân viên bảo vệ rừng tại cộng đồng và nỗ lực của ban quản lý khu bảo tồn. Khu bảo tồn thiên nhiên đất ngập nước Vân Long được sự quan tâm, ủng hộ cao của các cấp chính quyền cùng nhân dân vùng đệm với sự hỗ trợ của Hội Động vật học Frankfurt trong suốt 15 năm qua.

Kết quả những đợt khảo sát cho thấy 8 tiểu quần thể loài Voọc Mông trắng đã bị xóa sổ trong 10 năm vừa qua. Tổng số cá thể còn lại giao động từ 234 đến 275 thuộc 8 quần thể. Hai quần thể lớn nhất tại Khu bảo tồn thiên nhiên đất ngập nước Vân Long và khu vực dự định mở rộng của khu bảo tồn này. Tuy nhiên, hai quần thể này có thể xem là một vì điều kiện địa lý liên kề nhau. Điểm khác biệt chỉ là địa giới hành chính thuộc sự quản lý của hai tỉnh Ninh Bình và Hòa Bình.

Những tiểu quần thể đã được khảo sát lần này có kích thước rất nhỏ nên khó có thể tồn tại lâu dài. Vì vậy, hoạt động bảo tồn quan trọng là cấp thiết mở rộng Khu bảo tồn thiên nhiên đất ngập nước Vân Long. Diện tích của khu bảo tồn sau mở rộng có thể hỗ trợ một quần thể Voọc Mông trắng lớn được tồn tại và phát triển. Việc cải thiện tình trạng bảo vệ các tiểu quần thể nhỏ khác dường như không khả thi. Chưa có giải pháp bảo vệ hiệu quả bởi còn thiếu sự quan tâm của chính phủ nhằm cải thiện các hoạt động bảo vệ và bảo tồn loài.

Giải pháp di dời các tiểu quần thể nhỏ cũng không khả thi. Bởi vì việc di dời sẽ đòi hỏi kinh phí, kỹ thuật và nhân lực rất tốn kém, trong khi ít có những thành công tương tự được chứng minh. Mặt khác, việc thực hiện di dời trong tình trạng khó tiếp cận trên địa hình núi đá cũng là trở ngại rất lớn. Hiện nay, Trung tâm Cứu hộ Linh trưởng Nguy cấp đang thực hiện thành công chương trình cứu hộ, chăm nuôi và sinh sản. Mục tiêu của chương trình là cho sinh sản và thiết lập lên những bầy đàn ổn định để có thể tái thả chúng trở về môi trường sống tự nhiên có điều kiện an toàn. Một dự án thử nghiệm đã thành công thả vào tự nhiên tại Khu bảo tồn thiên nhiên đất ngập nước Vân Long một số cá thể được sinh trưởng trong điều kiện nuôi nhốt. Việc tiếp tục cho sinh sản, thiết lập các quần thể ổn định phục vụ chương trình hòa nhập vào tự nhiên là một trong những ưu tiên bảo tồn loài. Chương trình tiếp tục tái hòa nhập Voọc Mông trắng vào tự nhiên cũng đang được đề xuất đưa về Khu Di sản thế giới Tràng An, tỉnh Ninh Bình.

Kết luận, những hoạt động bảo tồn ưu tiên cho loài cần thực hiện chính là việc mở rộng Khu bảo tồn thiên nhiên đất ngập nước Vân Long và nghiên cứu tiên khả thi cho dự án tái hòa nhập loài này về Khu Di sản thế giới Tràng An, nơi có điều kiện tổ chức hoạt động bảo vệ tốt.

Các kế hoạch hành động bảo tồn loài cần được đề xuất và cấp thiết xây dựng kế hoạch hành động quốc gia chung và đối với loài linh trưởng này là một trong hai loài linh trưởng đặc hữu và quý hiếm của Việt Nam. Những hoạt động bảo vệ và bảo tồn cấp thiết sẽ là cơ hội cho sự tồn tại của loài.

Những tổn thất về mặt quần thể sẽ dẫn đến nhiều mối nguy hại và gây nên tuyệt chủng của loài và đây sẽ là sự mất mát về không chỉ cho Việt Nam mà cho cả thế giới.

Introduction

The Delacour's langur (*Trachypithecus delacouri*) is one of three primate species endemic to Vietnam, and listed as 'Critically Endangered' (IUCN 2015). Since the creation in 2000 of the biennial listing of a consensus of 25 primate species considered to be the most in need of urgent conservation measures, the Delacour's langur has been continuously listed. Based on the low number of individuals, the fragmented population and the dramatic decrease the species counts to "The World's Top 25 Most Endangered Primates" (Mittermeier et al. 2000; 2012).

For an assessment of the current status of the species, 20 surveys were carried out between 2012 and 2015 in all nine areas where populations of the species remain.

To illustrate the status and the dramatic decline of the species over a longer period an overview from the last decade of the 20th century is compiled.

The synopsis of the status shows the critical situation of the species. Conservation activities for the species are recommended, and the development of a National Action Plan for one of the Vietnamese endemic primate species would provide the basis to support the survival of the species.

Distribution and Status of Delacour's langurs in the wild

Distribution and Status of the species before 2000

The Delacour's langur was discovered during one of the expeditions led by Jean Delacour in 1930. The scientific description by Osgood (1932) was based on two animals, a male and a female hunted by locals and purchased in Hoi Xuan, a town close to the later established Pu Luong Nature Reserve, the area which is most probably the origin of the animals.

There exists no information about the species until the first living individuals were observed in 1987 in Cuc Phuong National Park (Ratajszczak, 1990).

This discovery was the background for Frankfurt Zoological Society to start a primate program in Cuc Phuong National Park to gather information about the species: status, distribution and biology.

With the start of the VIETNAM PRIMATE CONSERVATION PROGRAM in 1993 information from locals has been collected and comprehensive surveys conducted to locate populations of the species and to estimate the numbers of individuals. A first overview about the distribution and status noted 10 populations with a total of 121-186 individuals (Nadler, 1996). Following surveys state this information more precisely and resulted in the discovery of 19 subpopulations in a restricted area of northern Vietnam, covering about 5000 km² (Fig. 1). But the area of occurrence comprised only about 400 km² (Fig.2).

Taken from these surveys the total of all populations was estimated at 49-53 groups and 270-302 individuals (Nadler et al. 2003) (Table 1, Fig. 2).

In three areas where Delacour's

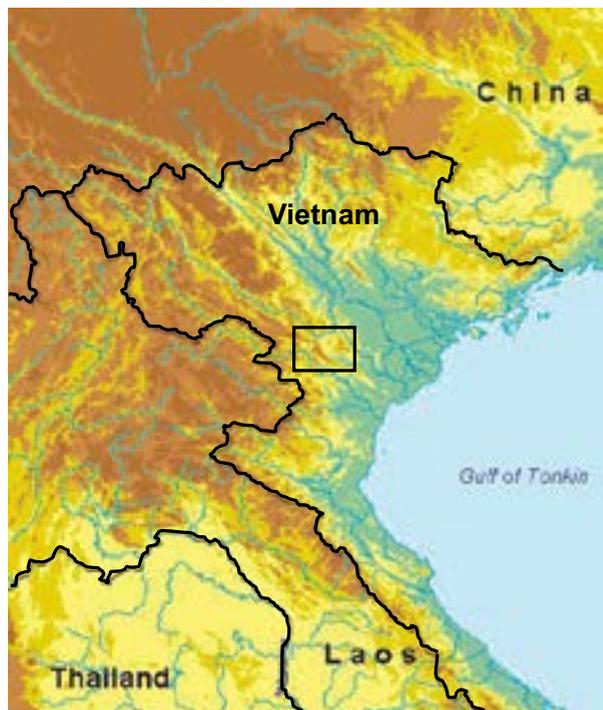


Fig.1. Distribution area of the Delacour's langur (*Trachypithecus delacouri*).

langur occurred in the past the species was already eradicated by the 1990s, following information

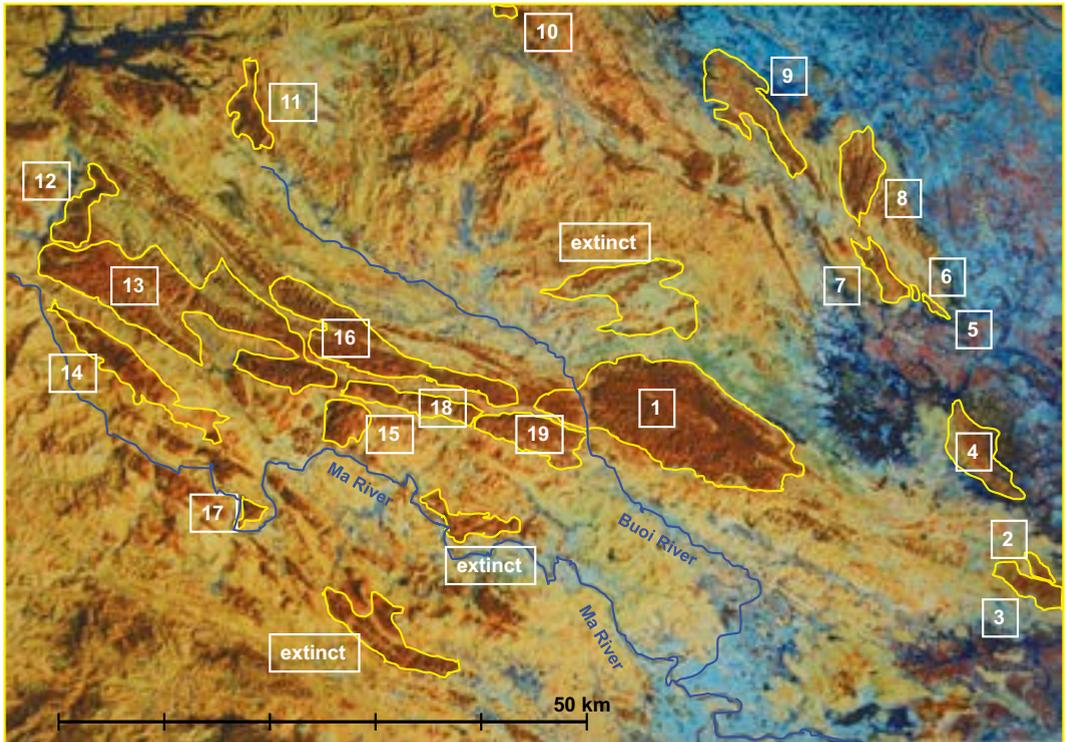


Fig.2. Areas with Delacour's langur populations 1990-2000.

Table 1. Number of groups and individuals of Delacour's langurs in the subpopulations before 2000.

provided by local people.

No.	Locality	Protection status	Groups	Individuals
1	Cuc Phuong National Park	National Park (1962)	4-5	20-25
2	Yen Mo mountain range	non	2	10
3	Bim Son mountain	non	4-5	14-18
4	Hoa Lu – Tam Coc	Nature Reserve (1996)	3	14
5	Van Long area (eastern part)	Nature Reserve (2001)	4	35-40
6	Van Long area (central part)	Nature Reserve (2001)	1	7
7	Van Long area (western part)	Nature Reserve (2001)	1	4-5
8	Lac Thuy – Kim Bang	non	1-2	20
9	Huong Son mountain	Nature Reserve (1993)	6	27
10	Roc mountain	non	1	2
11	Phu Vinh mountainous area	non	2	15
12	Mai Chau mountainous area	non	3	15

13	Pu Luong Nature Reserve (NE-part)	Nature Reserve (1999)	5-7	30-36
14	Pu Luong Nature Reserve (SW-part)	Nature Reserve (1999)	2	10
15	Northern Ba Thouc mountainous area	non	2	9-11
16	Ngoc Son mountainous area	Nature Reserve (2006)	1	5
17	Thiet Ong mountain	non	1	11
18	Nui Boi Yao mountainous area	non	4	17-27
19	Thach Thanh District	non	1	5
	TOTAL		49-53	270-302

Most of the animals occurred in small populations which are very sensitive to any impacts and in particular poaching. (Table 2). About half of all discovered populations (10) occurred in unprotected

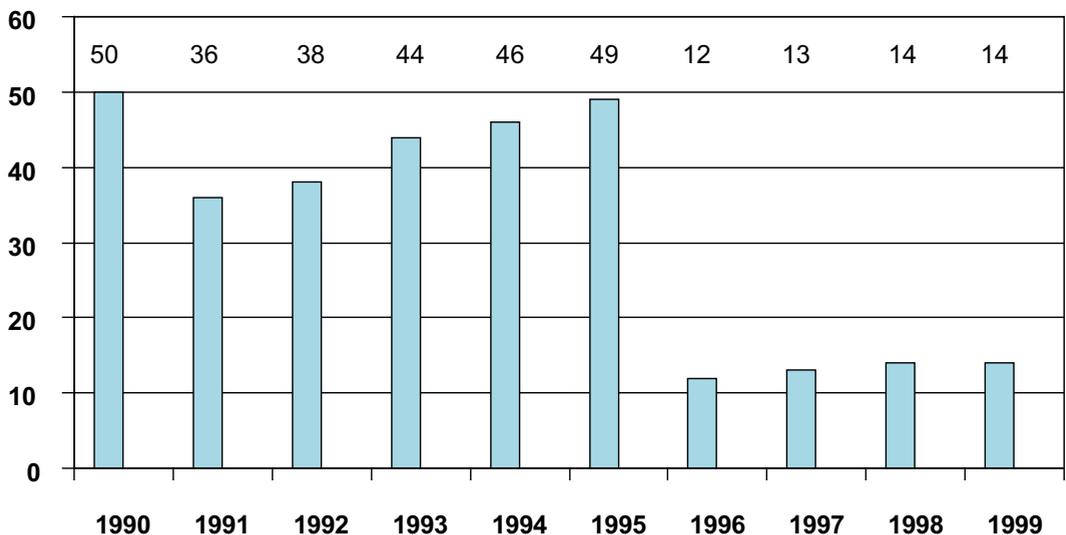
Table 2. Classification and numbers of individuals in subpopulations 1990 -2000.

areas (Table 1). The protection level in protected areas is mostly low, but still under control of the Forest Protection Departments. In unprotected areas there is no control over hunting, and the animals are under high pressure.

Number of individuals in one subpopulation	1-10	11-20	21-30	> 30
Number of subpopulations	8	6	3	2
Number of individuals in these subpopulations	52-55	89-93	63-79	65-75
Percent of individuals of the total population in these subpopulations	~20%	~30%	~25%	~25%

To get an impression of the hunting pressure, the number of hunted Delacour's langur in the distribution area was recorded (Table 3). This list is not complete, because some hunters were not

Table 3. Hunted Delacour's langur in one decade.



found, some didn't remember the exact numbers, and some were afraid to give information. However, these numbers are alarming enough and the recorded total over a period of ten years amounts to 316 individuals, an annual loss of more than 30 individuals.

Since 1996, a clear decline has begun, which has been influenced by the breakdown of some subpopulations and the complete disappearance of langurs in some areas. Based only on the known hunted langurs, the population has lost 50-55% during the decade 1990 to 2000.

Distribution and Status of the species 2000 – 2010

With additional surveys in the first decade of the 21st century the total number of recorded individuals increased slightly. The number of groups is 50-57 and the number of individuals 281-317. The increased total number of langurs resulted in the development of the population in Van Long Nature Reserve, the area under special protection through the Vietnam Primate Conservation Program, which included additional education and awareness programs for the surrounding communes of the area. The distribution of animals within subpopulations during this period indicates a reduction in the occurrence of larger populations compared to the previous decade. (Nadler 2004) (Table 4).

Table 4. Classification and numbers of individuals in subpopulations 2000-2010.

Number of individuals in one subpopulation	1-10	11-20	21-30	> 30
Number of subpopulations	7	8	2	2
Number of individuals in these subpopulations	48-50	119-138	44-54	70-75
Percent of individuals of the total population in these subpopulations	~17%	~43%	~17%	~23%

During this decade a number of small populations were eradicated. The exact years of extirpation cannot be verified. The information is based on interview surveys of local villagers, who indicated that the last sighting or record of the species was often several years ago. Therefore these small populations are believed to be eradicated (Table 5).

Table 5. Delacour's langur populations eradicated during the decade 2000-2010 (number and localities following Table 1).

No.	Locality	Survey	Last observation
10	Roc mountain	2008	before 2000
11	Phu Vinh mountainous area	2008	1999
12	Mai Chau mountainous area	2008	2002
15	Northern Ba Thuoc mountainous area	2008	before 2000
16	Ngoc Son mountainous area	2008	2004
17	Thiet Ong mountain	2006	before 2000
18	Nui Boi Yao mountainous area	2006	before 2000
19	Thach Thanh District	2010	before 2005

Distribution and Status of the species after 2010

Several surveys to monitor the development of populations were conducted after 2010. Only 9 areas are currently known where Delacour's langurs were recorded. It is from these areas that recent information and data were collected.

Survey organization and methods

A total of 20 surveys were carried out between 2012 to 2015 by the Endangered Primate Rescue Center (EPRC) and Forestry University Hanoi to verify the current situation of the species (Table 6).

Table 6. Surveys with the emphasis on Delacour's langur distribution and status after 2010.

No.	Locality	Survey Period	Organisation / Institution
1	Cuc Phuong National Park	January 2014 June 2015 July 2015	EPRC EPRC EPRC
2	Yen Mo mountain range	October 2014 February 2015	EPRC EPRC
3	Bim Son mountain range	June 2014 February 2015	EPRC EPRC
4	Hoa Lu Nature Reserve	June 2014 October / November 2014	EPRC EPRC
5, 6, 7	Van Long Nature Reserve	May 2014	EPRC
5, 6, 7	Van Long extension area	August 2012 August / September 2012 October / November 2012	EPRC EPRC EPRC
8	Kim Bang area,	November 2013 July 2014 October 2014	EPRC EPRC EPRC
9	Huong Son Cultural and Historical Site	March 2015	EPRC
13, 14	Pu Luong Nature Reserve	December 2011	University of Forestry

The surveys for this project were carried out by different survey teams, under leadership of Vietnamese biologists.

A survey team comprised mostly three to five people, the team leader, one or two forest rangers and one to two local villagers who are familiar with the area. The forest rangers consisted of staff from the protected area or if the area is not protected, staff of the district forest department. Larger areas or areas with difficult access were surveyed by two teams.

The duration of the surveys lasted from 5-17 days, depending on topography, and access to the area, and weather conditions.

Each field survey started with interviews of local people in order to gather information about date and localities of sightings. Locals are often very familiar with the area due to exploitation of several forest products, or even hunting and trapping. The Delacour's langurs are very well known by locals and with their unique appearance cannot be confused with other primate species in the area.

It is a useful practice to survey an area several times to evaluate and confirm the gathered information. Primate feces, collected from sleeping sites or in the surveyed areas were stored and identified by molecular genetic testing. The genetic identification was carried out by the German Primate Center.

Results of the surveys in the subpopulations

The results of the surveys in all known subpopulations shows a dramatic decline compared to the last decade (Table 1, 7 and 8). The total number is estimated at 234-275 individuals. The majority

occurs in Van Long Nature Reserve and if the population of the nature reserve is combined with the adjacent planned extension area to count as one population, the total for the area is 164-191 individuals. The remaining 70-84 individuals occur in the additional 7 areas (Table 7). Not one of these populations has a size which can guarantee a secure future, even if hunting could be eliminated. The problem of inbreeding for these small populations is not relevant. Before the inbreeding coefficient increases over a certain level, the populations will be extinct through other pressures.

Table 7. Overview about recorded groups and individuals of Delacour's langur in each subpopulation after 2010.

No.	Locality	Groups / Individuals confirmed	Groups / Individuals Interview	TOTAL Groups / Individuals estimated
1	Cuc Phuong National Park	2 / 3-4	1 / 7-9	2 / 10 - 13
2	Yen Mo mountain range	/	2? / > 10?	2? / < 10?
3	Bim Son mountain range	1 / 3?	3-4 / ?	3? / < 10?
4	Hoa Lu Nature Reserve	/	1 / 3-5	1 / 3-5
5, 6, 7	Van Long Nature Reserve	16-19 / 130-140	/	16-19 / 130-140
5, 6, 7	Van Long extension area	5 / ?	6 / 34-51	6 / 34-51
8	Kim Bang area	1 / 4-6	7 / 24-32	7 / 24-32
9	Huong Son Cultural and Historical Site	/	1 / 3-4	1 / 3-4
13, 14	Pu Luong Nature Reserve	/	? / 10	? / 10
	TOTAL	25-29 / 140-153	21 / 91- 121	37 / 234 - 275

Table 8. Classification and numbers of individuals in subpopulations after 2010.

Number of individuals in one subpopulation	1-10	11-20	21-30	> 40
Number of subpopulations	5	1	1	2
Number of individuals in these subpopulations	36-39	10-13	24-32	164-191
Percent of individuals of the total population in these subpopulations	~15%	~5%	~10%	~70%

The gathered data, despite all possible inaccuracy, show clearly the problem for the species and the extreme value of Van Long Nature Reserve as the last and only refuge which can enable the survival of the species.

Status of Delacour's langur in captivity

There exists only one small captive population of Delacour's langurs, which are housed at the EPRC. The goal of the EPRC is it to provide housing for confiscated individuals of highly endangered primate species, which should support the activities of forest rangers in law enforcement. These confiscated animals should act as founders for the establishment of small and stable captive populations and as a source for reintroduction if safe and adequate habitats are available.

The breeding program for Delacour's langur started with five wild caught, confiscated individuals. In 1996 the first animal ever of this species was born in captivity. In total, 23 individuals have been born at the EPRC, and currently the EPRC keeps 15 individuals. The reproduction rate of the species

is low with one individual been born on average, every two years per female. But the successful breeding program could provide stock for the establishment of a population in an adequately protected habitat.

Conservation interventions

Evidence of the dramatic decrease in populations was recognized and documented as long as 20 years ago. Conservation actions were provided and recommendations made to preserve this species. Unfortunately these early recommendations were never recognized and largely ignored (Do Thi Nga, 2013; Ebenau et al. 2011; Nadler et al. 2003; Nadler 2004). Beside the obviously stable and increasing population in Van Long Nature Reserve – based on special conditions – it is now foreseeable that no other population will have a chance for long-term survival. The current overview should be a wake up call and a starting point for actions.

Improvement of Protection

The primary focus of conservation activities for the species should be the protection of all remaining populations. But this is far from the reality. The protection of areas without current protection status - which are three areas (2, 3, 8) - is not feasible. To apply for a protection status and establish strong protection for an area is not a viable option for such extremely small populations with little chance of ever developing into viable populations. These populations will be eradicated and disappear in the near future.

The protection in protected areas – except Van Long Nature Reserve – is extremely low. The development of the population in Van Long - and similar examples in China for the white-headed langur (*Trachypithecus leucocephalus*) (Wenzshong Ran, 2003) and Francois langur (*Trachypithecus francoisi*) (Mingjing Li, 2004) - show a rapid increase of the population if hunting is eliminated. This means that a seemingly stable population in an intact habitat must be under hunting pressure, otherwise it would increase. But the populations in protected areas show a dramatic decrease as well – a sign of intensive poaching.

The relatively low protection in the protected areas is not solely based on low protection activities of the ranger staff, but also the difficult topography and accessibility of the areas hindering effective protection work, e.g. the long and narrow area of Cuc Phuong National Park provides a very long border and easy access to the core areas.

An immediate and drastic improvement of protection for the protected areas is no longer a realistic option for supporting the development of viable populations, as even with protection, the populations are now too small to ever be viable.

Habitat extension

The most efficient option to stabilize the largest existing population and to save sufficient habitat for the long-term existence of a viable population would be the extension of Van Long Nature Reserve. The possible extension area is about 4000 ha and therefore larger than the existing nature reserve, has similar habitat structure and forest cover. There are still no settlements in the appointed area. The total area would be more than 7000 ha. This would be the size which enables also the upgrade of the nature reserve to national park status. As a national park the area will receive much higher national and international attention, higher financial support and a higher number of staff.

Despite intensive efforts over several years the process is extremely slow and there is yet no obvious progression towards success. Three provincial Forest Protection Departments, Ninh Binh Province for the existing Van Long Nature Reserve, Hoa Binh Province for the possible extension area and Ha Nam Province as the province adjacent to the provincial border, have already signed an agreement and statement about the extension, but till now the Ninh Binh provincial administration (DARD) has refused the application for an extension.

The extension of Van Long Nature Reserve in the direction of the Kim Bang area, at least partly, and with the establishment of a corridor could also be of high benefit to the population and support the exchange of individuals. But the designation of the Kim Bang area for industrial exploitation for the cement industry and future tourism development make such option not feasible.

Translocation

Translocation of isolated groups of animals or small populations from areas under pressure or for improving the genetic pool of a larger population is undoubtedly for many species an important tool for conservation. Fragmentation of populations is an increasing problem. The surveys during the project time were carried out with an emphasis to assess the conditions of smaller populations for translocation actions. The most critical point is the method with which to catch the animals in the areas with often very difficult access. One way is netting of the animals in a cave, a sleeping place which the animals occasionally or preferentially use in the winter season. Special caves and cracks in the limestone outcrops are often used consistently by generations of animals in one group. But groups which use easily accessible caves are as a consequence of easy access, already wiped out by hunters and the remaining sleeping places are very difficult to access.

Currently there is no other proven technique for capturing animals in the difficult terrain that constitutes their natural habitat.

A high personal, financial and technical expenditure would be necessary to develop a technique to safely capture animals in the wild.

Reintroduction

A basis for reintroduction is the captive population of Delacour's langur at the Endangered Primate Rescue Center. In 2011 a first pilot project was conducted with the reintroduction of three captive born individuals into Van Long Nature Reserve (Agmen, 2014; Beaumont, 2012; Nadler 2012). Based on the successful result a second reintroduction took place in November 2012, also in Van Long Nature Reserve (Elser 2014; Elser et al., 2015). The programs have been very positively received by villagers and the awareness about protection of the species in the communes surrounding the nature reserve is very high. This has resulted in the long-term success of the Frankfurt Zoological Society conservation project and the strong involvement of local villagers and guards of the community protection unit in protection and conservation activities (Elser et al., 2013).

Based on the current status of the subpopulations at other sites and the low level of protection existing for them, the only viable option is to reintroduce captive bred individuals into Van Long Nature Reserve or to establish another new population in a well protected area.

From a conservation point of view, the establishment of a second population would be a preferable option in order to secure the long-term existence of the species. With a search of possible areas, only the newly nominated World Heritage Site "Trang An Scenic Landscape Complex" could provide a suitable habitat for a newly established population (Fig. 3). This 6000 ha area comprises larger limestone blocks surrounded by water and several islands (Fig. 4).



Fig.3. The limestone area with the World Heritage Site "Trang An Scenic Landscape Complex" including Hoa Lu Nature Reserve.



Fig.4. Islands in the World Heritage Site “Trang An Scenic Landscape Complex” which could serve as habitat for single groups of Delacour’s langurs. Island 1 ca. 1.5 ha; Island 2 ca. 1.5 ha; Island 3 ca. 6 ha; Island 4 ca. 5 ha.

As a first step small groups could be released to islands for ease of monitoring and management, including, animal exchange or removal of animals to other areas. With a growing number of individuals the release of animals from the islands into the larger area to establish a larger population could be feasible.

The area is a tourism spot and the langurs on the islands would not be disturbed by tourist boats provided entry to the islands was prohibited. Similar to Van Long Nature Reserve the animals on the limestone cliffs can be easily observed. This could be also widely used for education purposes and to spread the message about the dramatic situation for the species. For the area it would also be an interesting and additional highlight for tourists. This reintroduction project will be supported by the provincial Forest Protection Department Ninh Binh.

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