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STATUS AND DISTRIBUTION OF THE NILGIRI TAHR IN THE WESTERN GHATS, INDIA

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Suggested citation
Predit P. P., Prasath V., Raj M., Desai A., Zacharia J., Johnsingh A. J. T., Ghose D., Ghose P. S., Sharma R. K. (2015). Status and distribution of the Nilgiri Tahr Nilgiritragus hylocrius, in the Western Ghats, India. Technical report, WWF-India.

This project was funded by Nokia.

Photos by Paul Peter Predit

Design by Chhavi Jain / WWF-India

Published by WWF-India

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ACKNOWLEDGEMENTS

Researchers:

We thank field biologists B. Navaneethan, Suresh, Soffia, Immanuel Victor Prince and M.Ravikanth for participating in the field surveys at various stages. They were ably assisted and gained from the knowledge and skills of field assistants R.Veluswamy and Siddarth. We are grateful to the Forest Departments of Tamil Nadu and Kerala who readily granted us permission for carrying out this study in their respective states. We wish to thank Dr. K.P. Ouseph, PCCF and Chief Wildlife Warden Kerala and Thiru. R. Sundararaju, PCCF and Chief Wildlife Warden of Tamil Nadu for permits and support to this project.

We thank the present PCCF and CWLW of Tamil Nadu, Dr. V. K. Melkani, IFS, and present PCCF and Chief Wildlife Warden of Kerala, Thiru. G. Harikumar, IFS for their support in releasing this report.

Forest Officers:

Our sincere thanks to Mr. Rakesh Kumar Dogra, Wildlife Warden (Mukurthi NP); Ms. Mita Banerjee, DFO (Nilgiri South Forest Division); Mr. I. Anwardeen, DFO (Coimbatore Forest Division); Mr. B. N. Nagaraj, Wildlife Warden (Silent Valley National Park); Mr. O. P. Kaler, CCF & Field Director (Parambikulam Tiger Reserve), Mr. K. Anand, Deputy Director (Periyar Tiger Reserve); Mr. Roy P. Thomas, Wildlife Warden (Chinnar Wildlife Sanctuary), Mr. Sunil, Wildlife Warden (Eravikulam National Park); Mr. Mahesh Kumar, DFO (Munnar Forest Division); Mr. D. Venkatesh, DFO (Kodaikanal Forest Division); Mr. Srinivas Reddy & Dr. V. Ganesan, DFOs (Theni Forest Division); Dr. Shekhar Kumar Niraj (Virudhunagar circle); Mr. S. A. Raju & Mr. T. K. Ashok Kumar, Wildlife Warden (Srivilliputhur Wildlife Sanctuary); Mr. J. S. Ambrose, DFO (Tirunelveli Forest Division); Dr. H. Malleshappa, DFO (Kalakkad Mundanthurai Tiger Reserve), Mr. Ashok Upreti, CF (Tirunelveli Circle); Mr. T. Ritto Cyriac, Wildlife Warden (Kanyakumari Wildlife Sanctuary).

We are indebted to nearly a hundred field staff from the Kerala and Tamil Nadu Forest Department, who accompanied our field teams while searching for Nilgiri tahr. Their field skills, knowledge of terrain and their skill in locating the Nilgiri tahr in the field has been immensely valuable to this report. Without them, we would not have been able to cover some of the most inhospitable terrain of the Western Ghats.

The authors are thankful to Mr. Ravi Singh, Secretary General and CEO, WWF-India and Dr. Sejal Worah, Programme Director for their immense support in all aspects.

Urvana Menon, Shashank Srinivasan, Sanaa Nayar, Jagdish Upadhaya, Yash Shethia, Neha Midha, Renu Atwal, Joydeep Bose, Vikas Sharma and Nitya Kaushik are thanked for providing support at various stages of this work.

This project has been made possible due to the generous financial support from Nokia. WWF-India is grateful to Nokia for supporting its conservation endeavours in the Western Ghats and other parts of the country.

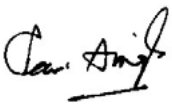
FOREWORD

Nilgiri tahr, an endangered mountain ungulate is endemic to the Western Ghats and the populations are under severe stress due to increasing anthropogenic pressures. This report is the result of a comprehensive study of the Nilgiri tahr population and its habitat in the hills of Tamil Nadu and Kerala. The survey has focused on the entire distributional range of the Nilgiri tahr from the Nilgiris to Kanyakumari in the Western Ghats to assess its status, threats faced by the species and its habitat and its population size.

This momentous task has been accomplished as a direct result of dedication and hard work of our field teams, valuable cooperation of the forests departments of the two states, guidance of leading experts on the species and civil society organizations.

The comprehensive report not only provides a first ever assessment of the status of the species across its entire distributional range, but provides insights into key threats faced by the species and charts out a roadmap for securing the future of the Nilgiri tahr.

Sincere thanks to institutions, individuals and partners who made this work possible. I hope the report will be useful in formulating a conservation action plan for the Nilgiri tahr so that this unique mountain ungulate continues to thrive in the hills and grasslands of Western Ghats.



–Ravi Singh, Secretary General & CEO, WWF-India

M.S.M. ANANDAN
MINISTER FOR FORESTS

SECRETARIAT
CHENNAI - 600 009.

Date.....

Message

It gives me immense pleasure to release the first ever comprehensive report on the status of the Nilgiri Tahr in the Western Ghats.

The Nilgiri Tahr is the State Animal of Tamil Nadu and symbolise both the biodiversity richness and the conservation challenges of the upper reaches of Western Ghats. These are areas that were transformed by the colonial project, with large areas cleared for plantation crops, commercial forestry and settlements.

The large scale habitat losses during colonial and post-colonial times, combined with hunting and other pressures resulted in the Tahr being eliminated from large parts of its historical range. Today, it is classified as an Endangered (EN) species and survives in a few isolated sub-populations scattered across the Nilgiris and southern Western Ghats. That is history; it is up to us to secure a future for this magnificent animal.

This report lays out a way forward for park managers and the conservation community in general. These include proposals for regular monitoring, protection, connectivity, habitat management and possibly re-introductions into suitable areas.

I congratulate WWF India and the Tamil Nadu Forest Department for conducting this survey and for preparing a species specific conservation road map. The Government of Tamil Nadu under the dynamic leadership of Hon'ble Chief Minister **"AMMA"** is committed to the conservation of the Western Ghats and will extend all necessary support for the conservation of the Nilgiri Tahr.

(M.S.M. Anandan)

MESSAGE

Thiruvanchoor Radhakrishnan

Minister for Forests, Environment,
Transport, Sports & Cinema, Kerala

It gives me great pleasure to release this survey report on the status of the Nilgiri tahr in the Western Ghats.

The Nilgiri tahr has, quite literally, been living on the edge. Habitat destruction, developmental activities and poaching have all contributed to the unenviable status it enjoys today – as Endangered (EN). While Western Ghats is a biodiversity hotspot rich in rainforest species, the Nilgiri tahr is an emblem of the unique grasslands and shola systems of high mountains.

The Government of Kerala and the people of the state are justifiably proud of the efforts we have made so far to safeguard and bring this animal back from the edge. The single largest population exists in Eravikulam National Park, a Protected Area that was created for the immediate purpose of protecting this magnificent animal. The total population of Tahr today stands at 3000 while several small but new populations have been discovered by the joint efforts of WWF and Forest Department.

But we cannot rest on these achievements. The threats remain and we must remain vigilant and proactive in our efforts to conserve the Nilgiri tahr. This report gives us the overall picture of its precarious status across the states of Tamil Nadu and Kerala and tells us what remains to be done to secure its future. The report highlights the need for strengthening collaboration between government, scientists, NGOs and citizens for ensuring long-term conservation of Tahr. It is important for us to implement these recommendations across its range, across state borders with the cooperation of all stakeholders.

I congratulate WWF India, Kerala Forest Department and all other contributors for bringing out this excellent report.

Thiruvanchoor Radhakrishnan

Minister for Forests, Environment,
Transport, Sports & Cinema, Kerala

Thiruvananthapuram
23.09.2015

Dr.V.K. Melkani, IFS
PCCF & Chief Wildlife Warden
Chennai-15

Thiru Hans Raj Verma, IAS
Principal Secretary to Government
Environment & Forests Department
Secretariat, Chennai-9.

Message

The Nilgiri Tahr holds a special place as the state animal of Tamil Nadu.

The populations of Nilgiri Tahr in the Western Ghats are under threat from habitat loss, local hunting, unregulated tourism and other developments in the grassland-shola matrix where they mostly exist. Many development activities, especially plantations of exotic species, have transformed the grasslands and sholas which form the very heart of Tahr habitat.

This comprehensive study of the Tahr population and its habitat in the Western Ghats of Tamil Nadu and Kerala has covered the entire distributional range of the Tahr from the Nilgiris to Kanyakumari and assessed the various threats faced by the species, the habitat conditions where they exist and the population status. More importantly for us as conservation managers, it makes a set of specific recommendations for securing the recovery and long-term survival of the species.

There are very few large populations of the Tahr and even these populations are isolated from one another. Therefore, they are prone to problems associated with inbreeding and vulnerable to local extinction.

This task has been achieved through close cooperation of WWF India and the Forest Departments of Kerala and Tamil Nadu, and inputs from leading wildlife experts and civil society. The future of the Nilgiri Tahr too hinges on such close collaboration between various stakeholders - government agencies, civil society, scientists and local communities from the two range States.

We congratulate WWF India and all the other contributors for bringing out this excellent report.

(V.K. Melkani)

(Hans Raj Verma)

MESSAGE

G.Harikumar IFS

Principal Chief Conservator of Forests (Wildlife) & Chief Wildlife Warden, Kerala

Western Ghats is a biodiversity hotspot with high potential for long term conservation of a rich floral and faunal diversity. Historically, our country has strong ethos for conservation, but conservation is becoming increasingly challenging with a rapidly growing human population, high dependence on natural resources and rising conflicts between people and wildlife. Of several fascinating wildlife species found in the Western Ghats, Nilgiri Tahr has a special significance, one being an endemic and second being the only mountain ungulate species occurring in Southern India.

'Status and distribution of Nilgiri tahr in the Western Ghats, India' is a range wide assessment of the Nilgiri Tahr, its habitat and the threats that the species faces across its entire distributional range. The study is a result of unprecedented collaboration between the experts of WWF-India and State Forest Department of Kerala and neighbouring Tamil Nadu. This study provides updated and comprehensive information on the population of the Nilgiri Tahr, the key threats to its habitat and provides a roadmap for developing a strategy for long-term conservation of the species.

Altogether, this study presents the much needed information to policy makers, conservationists, academician and citizens about steps required for ensuring the connectivity between different population and restoration of degraded habitats to eventually result in a better and significantly larger habitat for Nilgiri Tahr.

This indeed is a commendable effort and collaboration between stakeholders and scientific monitoring of Tahr population that the report proposes will go a long way in ensuring the conservation of this unique mountain ungulate.

G.Harikumar, IFS

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SUMMARY

Of all mountain ungulate species distributed in India, the Nilgiri tahr is the only one that exists in southern India. It is believed to have once been spread across the entire extent of the Western Ghats. The species is endemic to the Western Ghats of Kerala and Tamil Nadu. Over the years, the Nilgiri tahr population has declined, which can be attributed to uncontrolled hunting, conflict with livestock grazing and habitat loss. These threats were reduced to some extent after the Wildlife (Protection) Act of India, 1972 was promulgated.

Earlier information on the population and distribution of this species came only from some of the larger populations and the estimated number was a little above 2000. However, many unknown populations were also believed to exist in small pockets throughout its range. These potential areas had not been surveyed due to the rugged terrain that remains inaccessible for more than half the year because of heavy rains, mist and fog, thereby limiting our understanding of the status and the distribution of the tahr across its range.

In this survey, we assessed the current population status and distribution of the tahr across its entire distribution range. After collating data from all existing sources, including the surveys in this study, the total population of Nilgiri tahr was estimated at 3,122 individuals. We also located 17 previously unrecorded smaller pockets of Nilgiri tahr habitat, totaling 131 individuals. We identified sizeable conservation units, key threats to tahr populations and measures to minimize these threats in the identified units. These units need periodic monitoring for the successful conservation of the species. We present a roadmap for ensuring long-term conservation of this species endemic to the Western Ghats. There is potential to have a population of 5000 tahr in the Western Ghats with good conservation planning and follow-up actions.

1. INTRODUCTION

The commonly known "Nilgiri tahr" (*Hemitragus hylocrius*, old name; *Nilgiritragus hylocrius*, new name) is an endangered species of mountain sheep (Ropiquet and Hassanin, 2005). The Nilgiri Tahr was originally placed with the Himalayan and Arabian Tahr in the genus *Hemitragus*, but recent genetic analysis suggested that it is a sister group of *Ovis* and has since been transferred to new genus *Nilgiritragus* (Ropiquet and Hassain, 2005). The Nilgiri tahr is the only mountain ungulate found in southern India amongst the 12 species that occur in India (Fox and Johnsingh, 1997). Nilgiri tahrs inhabit montane grasslands with rocky cliffs at elevations of around 300m to 2600m above mean sea level. The Nilgiri tahr is a social animal found in mixed herds composed of adult females and their young. Adult males associate with larger mixed herds during the breeding season, but are often solitary or in smaller all male groups during the non-breeding season (Davidar, 1978; Rice, 1985 and1988a). Female herds inhabit particular home ranges while adult males move between these groups of females (Madhusudan, 1995). There is significant sexual dimorphism – males are larger in size and have bigger horns than females. The main breeding season (rut) is during the monsoon, though breeding may occur throughout the year if the young ones are lost. The gestation period is about 6 months. Leopards are the primary predators of this species, although dholes and tigers also occasionally prey on the tahr (Prater, 1971; Davidar, 1978 and Rice, 1990).

At present, only two well-protected, large populations are documented, one from the Nilgiris and the other from the Anamalais, including the high ranges of Kerala. Smaller populations are known to occur in the Palani hills and the Megamalai and Agasthyamalai ranges. The present geographic limit of the Nilgiri tahr distribution is along a narrow stretch of 400 km between 11°30' N - 8°20'N, bound by the Nilgiris in the North and the Kanyakumari hills in the south. However, there is also a potential habitat for this mountain ungulate in Kudremukh hills (Johnsingh, 2013). The species is listed in Schedule I of the Wildlife (Protection) Act of India, 1972 which gives it a special protection status. It is also categorized as Endangered in the IUCN red list 2014. (http://www.iucnredlist.org/details/9917/0).

There was no comprehensive data on the current status and distribution of the species and despite several studies over the years, only rough distribution and crude estimates of Nilgiri tahr populations were available. The species has always been under severe stress on account of the construction of numerous hydroelectric projects, timber felling and monocultures of eucalyptus, wattle, pine and tea in the original grassland ecosystem. All these development activities, especially the plantation activities, affect the core tahr habitat, which comprises grasslands and sholas (Schaller, 1977; Davidar, 1978).

The present distributional range of the Nilgiri tahr is highly fragmented, and the population dynamics are not well-studied, with the exception of the Eravikulam National Park (Rice, 1986 & 1988b). Studies on big-horn sheep have reported that groups with a population of less than 50 individuals can be wiped out within 50 years and that at least 100 adult individuals would be required in a group to ensure its long-term survival (Bissonette, 1998; Krausman, 2000). Thus, it is important to identify the smaller populations, evaluate the threats they face and assess their connectivity with surrounding populations.

With this background, it became urgent and necessary to launch a comprehensive study in the Western Ghats of Tamil Nadu and Kerala to understand the present population status and ecological requirements of the Nilgiri tahr. For an endemic species like the Nilgiri tahr, which has a narrow range of distribution, future conservation strategies require a thorough understanding of its distribution and population status, habitat connectivity and an assessment of threats to its survival. It is known that species with specific habitat preferences and a small geographic range are less likely to adapt to environmental changes (Primack, 1993).

Based on these factors the objectives of the present study were to –

1. Survey and assess current population status and distribution of the Nilgiri tahr

2. A rapid assessment of major threats to the surviving populations

3. Estimate the potential Nilgiri tahr habitat using existing data.

2. REVIEW OF LITERATURE

The estimated number of Nilgiri tahr in the wild is about 2000 individuals (Daniel, 2008). This number is mainly based on literature surveys of the existing work including Davidar, 1978; Rice, 1984 and 1988a; Daniels, 1987; Chakraborty, 2000 and Daniel, 2006 and Abraham et al. 2006. A survey of the part of the Western Ghats in Kerala estimated around 998 individuals (Abraham et al. 2006).

The Nilgiris population is the most studied and its population trends are available due to studies conducted over several years. Pythian-Adams estimated around 400 tahrs in the Kundah during 1927 and around 500 in 1931 (Pythian-Adams, 1939). George Schaller counted about 176 tahrs in the Nilgiris (Schaller, 1969). Davidar sighted around 292 tahrs during 1963 and estimated the numbers to be around 400 (Davidar, 1963 and 1975). Later, his 1975 surveys quoted about 334 individuals sighted, which resulted in an estimate of 450 tahrs (Davidar, 1976 and1978). Stephen Sumithran provided an estimate of 102 tahrs during 1994 and 152 individuals in the year 1995 with estimates ranging between 174 and 1,164 using outer bound method (Sumithran, 1995).

The estimated number of tahr in the Nilgiris in 1997 was 246 (Murugan 1997). The Nilgiri Hills and the Eravikulam populations were conserved mainly through the active work by the Nilgiri Game Association in the Nilgiris and the High Ranges Preservation Association in Munnar (Schaller, 1969).

George Schaller had reported around 439 tahrs in the Eravikulam and estimated their numbers at around 500 (Schaller, 1969). Another estimation for the park was about 500 individuals (Daniels, 1971) while 650 individuals were estimated by Davidar (Davidar, 1978) followed by about 550 individuals by Rice (Rice, 1984 and 1988c). Abraham et al estimated tahr numbers at 696 in April 2000; 559 in October 2000 and 444 in December 2001. In the Anamalai and Parambikulam Sanctuaries the population was estimated between 560 and 680 (Mishra and Johnsingh, 1994) while Davidar, 1971 and 1978 and Rice, 1984 estimated around 595 individuals. However, these surveys do not cover the entire distribution range of the Nilgiri tahr. Additionally, there was no standard protocol in place for population estimation; different studies followed different approaches while arriving at estimates. Therefore, the population estimation had not been done systematically or in a synchronized manner in the entire range. Most of the previous surveys do not report the actual sighting numbers, nor was a consistent methodology like outer bound count followed in estimating numbers (except for Eravikulam for a decade and recently in Mukurthi). The present study has reported only the minimum numbers sighted to maintain consistency and to serve as a baseline for future comparisons.

3. METHODS

To carry out the present study, field teams with biologists and their field assistants were trained at Eravikulam National Park on survey techniques and on observing tahr and its behaviour. The team then started the survey of potential tahr habitat areas from the northernmost part (beginning at Nilgiris) to the southernmost part (extending up to Kannyakumari Wildlife Sanctuary) along the Western Ghats. The number of tahr was recorded along with age-sex composition of the groups.

3.1 Secondary data on potential Nilgiri tahr habitat:

To identify all potential tahr habitats across the entire range, we compiled existing data on the historical distribution of the tahr by extensive research of available literature (Table 1).

We used the knowledge of the species' habitat requirements (grasslands, sholas and cliffs) to model their potential habitat using a Digital Elevation Model (DEM) and classify the area into different slope categories. Grass-covered areas with slopes greater than 45 degrees were identified as steep slopes or cliffs. This coincided with previously known tahr sites.

This approach allowed us to determine the key areas that required surveys. The model helped identify the mountainous areas of Western Ghats, especially areas with steep slopes and cliffs. In places facing high levels of disturbance in the form of hunting and other anthropogenic pressures, Nilgiri tahr tend to keep close to the cliffs and may not venture further. Cliffs provide refuge from natural predators as well as human disturbances and thus play an important role in habitat use for all mountain ungulates.

We used a 5 km buffer around the known tahr locations to understand the linkages between populations. Based on this, the tahr populations were divided into five large groups, separated from each other by physical barriers, such as the Palghat gap and Bavani River, and habitat fragmentation created by roads, railway tracks and settlements (Shencottah Gap). We believe that a detailed genetic study would help understand the population connectivity as well as the effects of habitat fragmentation on genetic variation of the population.

3.2 Conducting a stakeholders meeting to collate current information on the distribution and status of the species:

A stakeholder's workshop was conducted in Coimbatore in 2007 to discuss and compile information on the "Current state of existing knowledge with regard to the Nilgiri tahr". The participants were from the Forest Departments of Tamil Nadu and Kerala, NGOs and researchers working in this tahr landscape. The main discussion focused on the types of data that needed to be gathered and the development

of standardized age-sex classification. The potential Nilgiri tahr areas across the landscape and methods to be employed for the study were also discussed.

3.3 Field surveys by WWF-India teams:

After the potential Nilgiri tahr habitats had been identified, field surveys were carried out in these areas between 2007 and 2011.

Prior to the field surveys, forest department personnel from the concerned areas were consulted to get the respective records of tahr from previous years. One local staff from the concerned department in each area was involved with our team in conducting the field surveys.

The survey area was covered on foot. The survey time ranged between two to ten days per session, depending on accessibility and weather conditions. Several such sessions were carried out to cover the entire area. Binoculars with 10 × 50 magnification and spotting scopes (20–60 × 60) were used for spotting, observing and classifying the individuals in the field.

3.4 Collaborative surveys with the forest department and local stakeholders:

The collaborative surveys were conducted in four forest divisions including Mukurti National Park and its adjoining areas, Kodaikanal, Munnar, Theni and Rajapalayam (for details, see Appendix II). The partner institutions included Tamil Nadu Forest Department, Tamil Nadu Police (Theni), Nilgiri Wildlife and Environment Association, Palani Hills Conservation Council, Vattacannal Conservation Trust, High Ranges Preservation Society, Vanam of Theni and Wildlife Association of Rajapalyam. Collaborative surveys were conducted by a small team of biologists at different seasons in sites that have connectivity. Hence, stakeholders of different blocks were organized to conduct the tahr census and cover the whole habitat of the potentially connected areas within the blocks.

The collaborative census helped in developing a better understanding of abundance and distribution of tahr in the surveyed areas. The field experience from surveys in Mukurthi and Eravikulam National Parks, where the outer bound count method (Giles, 1978) was followed, showed that high emphasis on scanning and surveying rocky and cliffy areas produced better results.

The following information was gathered during the field surveys:

1. Presence-absence of the tahr established by direct sightings or by presence of pellets

2. Minimum numbers of tahr present, based on actual numbers seen during the surveys. Efforts were made to minimize double counts. Individuals likely to be double counts, based on time and location of

sighting were excluded from the totals. Mishra and Johnsingh (1998) followed this method while surveying tahr habitats in the Anamalais.

3. Age-sex structure of the population was done based on the method described by Schaller (1971) and Davidar (1978) with modifications from Rice (1984). The classification is as follows –

a. Young: Age 0-1 years; grey-brown or light brown coat; horns up to 7cm in length; maximum 45cm height at the shoulder

b. Yearling: Age 1-2 years; grey-brown coat; intermediate in size between young and adult females; horns up to a maximum of 12 cm

c. Adult female: Age 2+ years; grey-brown coat; carpal patch black; height at shoulder 70–80cm; horns slender and maximum of 30 cm

d. Light brown male: Age category 2-4 years; similar in body and horn size and pelage to adult females; horns thicker with facial markings sometimes slightly more distinct; easily identified when the genitals are visible.

e. Dark brown male: Age category 5 years, grey-brown to dark brown coat; larger and more robust than adult females; larger horns and more distinct facial markings; carpal patches white.

f. Saddle-back male: Age category 6+ years; dark brown coat with an area of light brown/ white/ silvery hair covering the lower back; rump and/or flanks; carpal patches white.

In addition to direct field observations, groups were also photographed where possible and the photographs were used to identify the number and classification.

3.5 Major conservation threats

Major conservation threats were assessed. These included signs of human presence (sighting of people, camping and collection of fuel wood), snares, cattle grazing, unauthorized trekking and poaching. These threats were recorded and evaluated.

3.6 Estimating the current extent of the Nilgiri tahr habitat

was done following a Maximum Entropy (MaxEnt) modelling approach.

4. RESULTS

4.1 DISTRIBUTION AND POPULATION OF NILGIRI TAHR

The map given below (Figure 1) shows the areas surveyed for the Nilgiri tahr across its present distribution. Based on the connectivity between tahr habitats and preliminary surveys, the study area was sub-divided into five blocks (Figure 1), which may have interconnectivity. The populations in these blocks were considered to be functioning as meta-populations
These blocks are as follows:

1. Nilgiri Hills
2. Siruvani Hills
3. The High Ranges and Palani hills
4. Srivilliputhur, Theni hills and Tirunelveli hills
5. KMTR and Ashambu hills

[1] NILGIRI HILLS

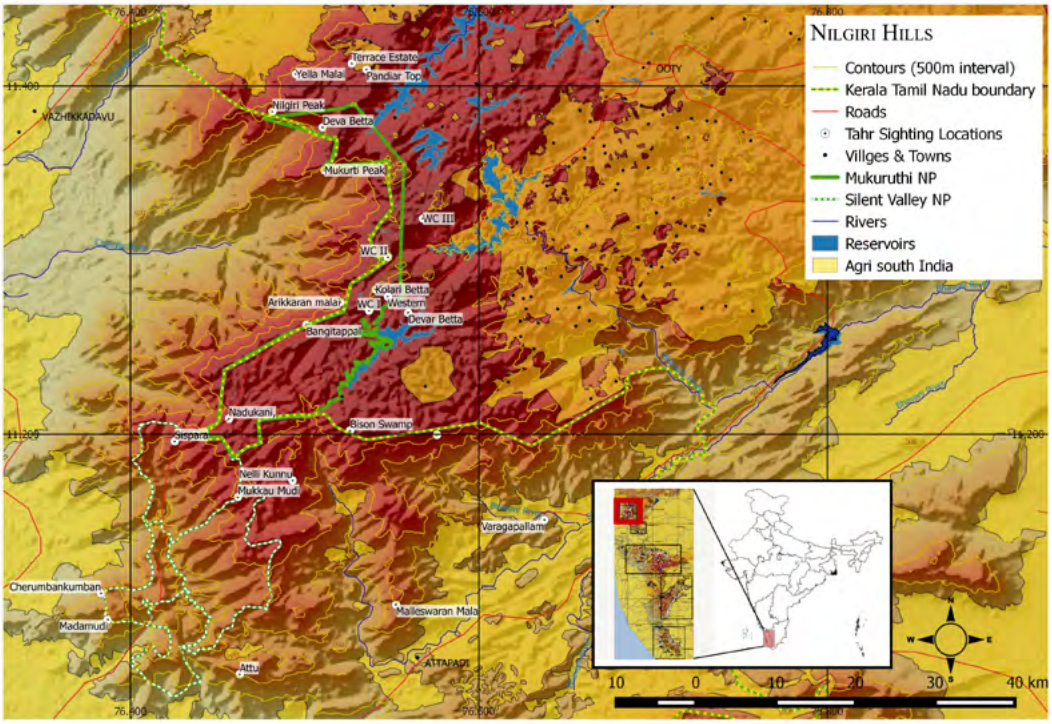
We first concentrated on the tahr population in the Nilgiris. The tahr area in this region falls under the jurisdiction of two different Forest Departments. This landscape includes Mukurthi National park, Nilgiris South Forest Division, Silent Valley National Park, Gudalur Forest Division, Nilgiris North Forest Division and Sathyamangalam Wildlife Sanctuary (Figure 2). The Germalum range has tahr habitats but today there are no tahrs in Sathyamangalam Tiger Reserve, which is in the Eastern Ghats, though they would have likely existed here historically

In localities common to the present and past surveys, the population size (minimum count) was observed to be higher in the present survey. In the present surveys, we intensively surveyed cliff areas in addition to the grasslands and this strategy yielded a higher number of tahr sightings than previous surveys in the same area. Table 2, Appendix I provides an overview of the tahr abundance and population structure in this block.

(A) MUKURTHI NATIONAL PARK

The Mukurthi National Park (MNP) is a prime tahr habitat reserved for the protection of this species with an area of 78 km2. The area was first protected as a Reserved Forest in the year 1886. In 1982, it was declared a Sanctuary and was later elevated to National Park status in 1990. This region receives some of the highest rainfall in southern India and is an important water catchment area for Tamil Nadu. It also contributes to more than 40% of the state's hydroelectricity production. The elevation varies from 1,450 m to a maximum of 2,629 m (Kolaribetta, the tallest peak). Other peaks are Mukurthi (2,554 m), Pichal betta (2,544 m), Devabetta (2,531 m), Nanjundamalai (2,465 m) and the Nilgiri peak (2,476 m)

Figure 1: Nilgiri tahr habitat and sighting locations in the Nilgiri hills



Observations:

In the MNP, we identified 13 different groups with an average group size of 26 individuals. Every group was observed to have young ones and yearlings which indicated that the population was a healthy, breeding population.

Threats:

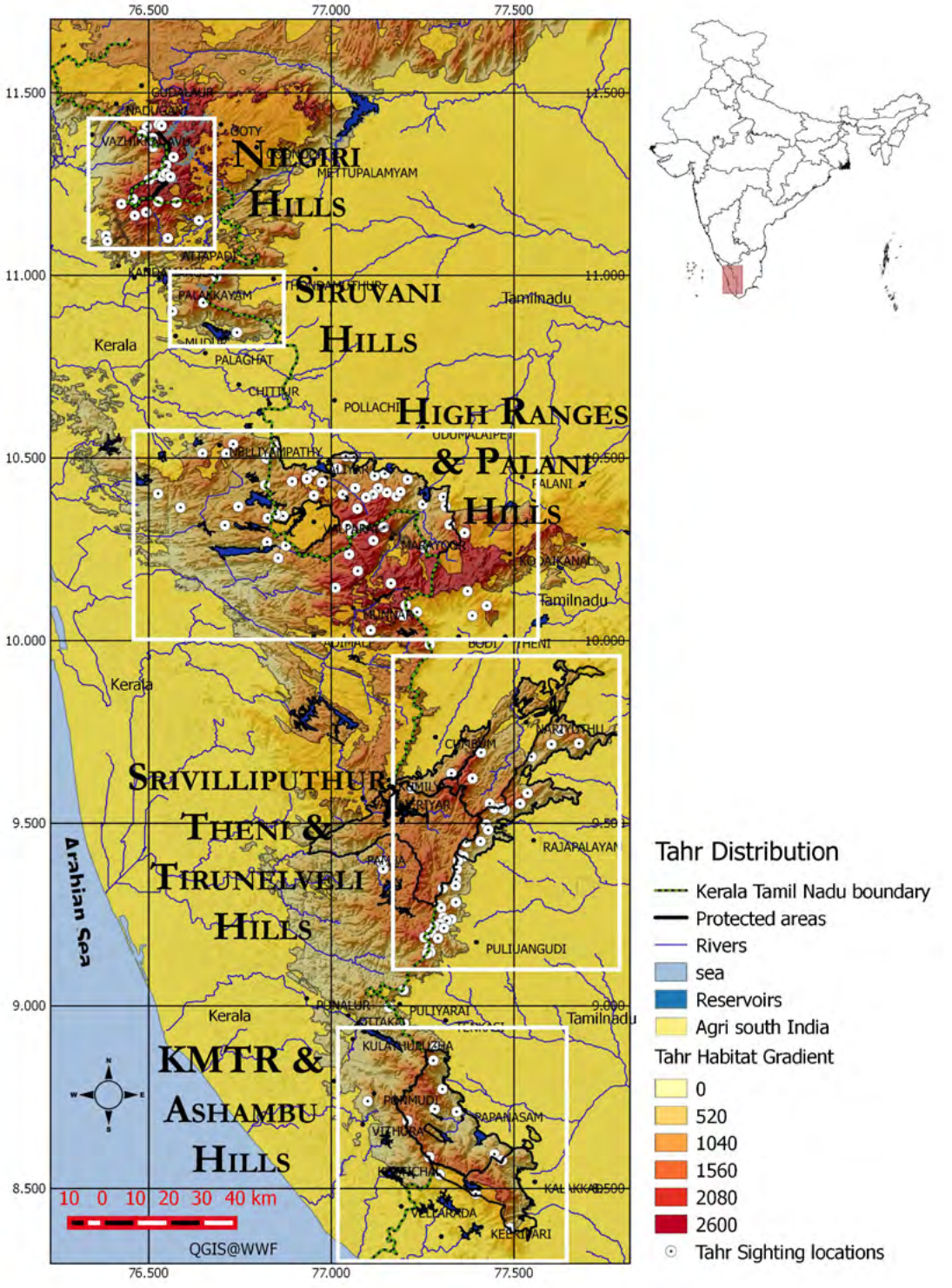
In the upper Nilgiris, tea, coffee and cinchona plantation began about 150 years ago and now large areas of the upper Nilgiris are under tea cultivation (Shanker, 1997). The MNP is actively patrolled and is presently well-protected from poachers. Fires in the park remain a threat but active measures are being taken to control it. Poaching from the Kerala side can be a potential threat as the tahr habitat is very close to Kerala. The present anti-poaching camp on the way to Sispara (in an area without water) should be dismantled and a camp in a suitable place with perennial water supply should be built which can help in year round monitoring and protection.

Table 1: Status of tahr in different forest blocks across its distribution range.

Block	Protected areas	Population	Survey status
Nilgiri Hills	Mukurthi National Park complex	463	Census figures
	Silent Valley National Park	18	Completed
Siruvani hills	Palghat Forest Division	99	Partly Completed
	Coimbatore Forest Division	2	Partly Completed
High Ranges & Palni hills	Parambikulam Tiger Reserve ^	63	Completed
	Vazhachal **	15	Partly Completed
	Munnar Forest Division	182	Census figures
	Eravikulam National Park *	700	Census figures
	Chinnar Wildlife Sanctuary	33	Completed
	Anamalai Tiger Reserve #	626	Census figures
	Kodaikanal Forest Division	25	Completed
Srivilliputhur, Theni & Tirunelveli hills	Theni Forest Division	193	Census figures
	Grizzled Giant Squirrel Wildlife Sanctuary- Srivilliputhur	150	Census figures
	Periyar Tiger Reserve **	16	Completed
	Tirunelveli Forest Division **	85	Partly Completed
	Ranni Forest Division **	42	Partly Completed
KMTR & Ashambu hills	Kalakkad - Mundanthurai Tiger Reserve	84	Completed
	Neyyar Wildlife Sanctuary **	76	Partly Completed
	Kanyakumari WLS **	250	Partly Completed
Total		3122	

*Forest department census; # Mishra et.al, 2006; ** Easa et.al. 2011; ^ WWF & Easa et.al 2011; Rest all WWF – India
Easa et.al, has estimated tahr population based on the secondary information collected from the collective meeting of the protected area managers and NGO's around the divisions. This study used the population estimation from their report for areas that were not covered as it contained the latest information

Figure 2: Map showing different tahr population blocks across the present tahr habitat and the sighting locations in each population block.



(B) THE NILGIRIS SOUTH FOREST DIVISION

This division is contiguous with the MNP, extending far out into the Ootacamund plateau. Most of the grasslands in this Forest Division were converted into exotic plantations such as wattle, pine and eucalyptus. Some small sections of these exotic plantations, adjacent to the MNP, have failed resulting in some areas becoming available for the Nilgiri tahr.

Observations:

Five groups of tahr were recorded while only one sub-adult was sighted on the Kinnakorai slopes (herds with n < 3 were not considered groups). Since the terrain is contiguous, the groups were observed to be moving freely between the surveyed locations.

Threats:

1. Kinnakorai and Meekeri betta
This habitat is surrounded by the agricultural lands of Kinnakorai villagers. A settlement of 12 families known as Thani Kandi is also present within the habitat. There is a very prominent trail cutting across the area, which is intensively used by local people. We encountered a snare made of thick climbers and probably meant for capturing ungulates. This area also faces threats of accidental fires as it is surrounded by villages. Local people also have tea estates adjoining the tahr habitat.

2. Kudiakadu betta
Monoculture plantations in this area seem to restrict the free movement of the animals across the habitat.

3. Varahapallam
The village down the slopes in Kerala forests also pose a threat, as poaching seems to be on the rise. Snares for large mammals were encountered during our surveys. Sumithran (1995) has also encountered snares, spear-heads and heard gun shots from the Varahapallam areas.

(C) SILENT VALLEY NATIONAL PARK

This division is connected to the Mukurthi National Park on its southern side. The Ankindamalai grasslands are contiguous with the Mukurthi grasslands. This area falls under the states of Tamil Nadu and Kerala and while they mainly comprise rainforests, there are a few grassland peaks which hold Nilgiri tahr in this division.

Observations:

In Silent Valley National park, six potential areas were scanned during our study. Nigiri tahrs were sighted in four of these sites. Indirect evidence was found in two additional areas. Of the localities where tahrs were recorded in this survey, only the Anginada malai, where Davidar

(1978) recorded 30 individuals, had been previously surveyed. All the other areas were newly surveyed tahr areas, where this species was not reported previously. In this study, Ankinda malai was not surveyed extensively due to adverse weather conditions. A total of 18 individuals were seen during this survey. The protection level in this area seems reasonably good.

(D) GUDALUR DIVISION

The Gudalur Division has a small pocket of tahr population. This area is well-connected with the MNP. This area also represents the northern-most surviving population of the Nilgiri tahr. This forest area is contiguous to the Mukurthi National Park, but has been demarked into Gudalur Forest Division.

(E) NILGIRI NORTH FOREST DIVISION

The Glenmorgan and Kodanad areas were surveyed in the Nilgiri North Forest Division, where we did not find any direct or indirect evidence of tahrs. In previous surveys, E.R.C Davidar had reported the presence of around 20 tahrs during the 1960's (Davidar, 1963). The tahrs in this region seems to have been extirpated since then. The tahrs on the isolated cliffs of the northern and eastern faces of the Nilgiris, which were reportedly not hunted, also appear to have disappeared long ago (Davidar, 1977). The tahr population in these areas could have been wiped out due to poaching and increased human colonization around the habitat. The Glenmorgan areas are very promising for potential reintroduction of tahrs (Davidar, 1978). A proposal to reintroduce tahrs in Glenmorgan was discussed in the Standing Committee meeting of the National Board for Wildlife held in October, 2012 and was approved. Now, Tamil Nadu Forest Department has to make a decision on this matter (AJT Johnsingh, pers. comm).

(F) SATHYAMANGALAM WILDLIFE SANCTUARY

Geddesal in Sathyamangalam Wildlife Sanctuary was locally known to have tahrs. The hillock was surveyed but no sign of tahr presence was recorded, though the area is a potential tahr habitat. The population could have been wiped out due to poaching.

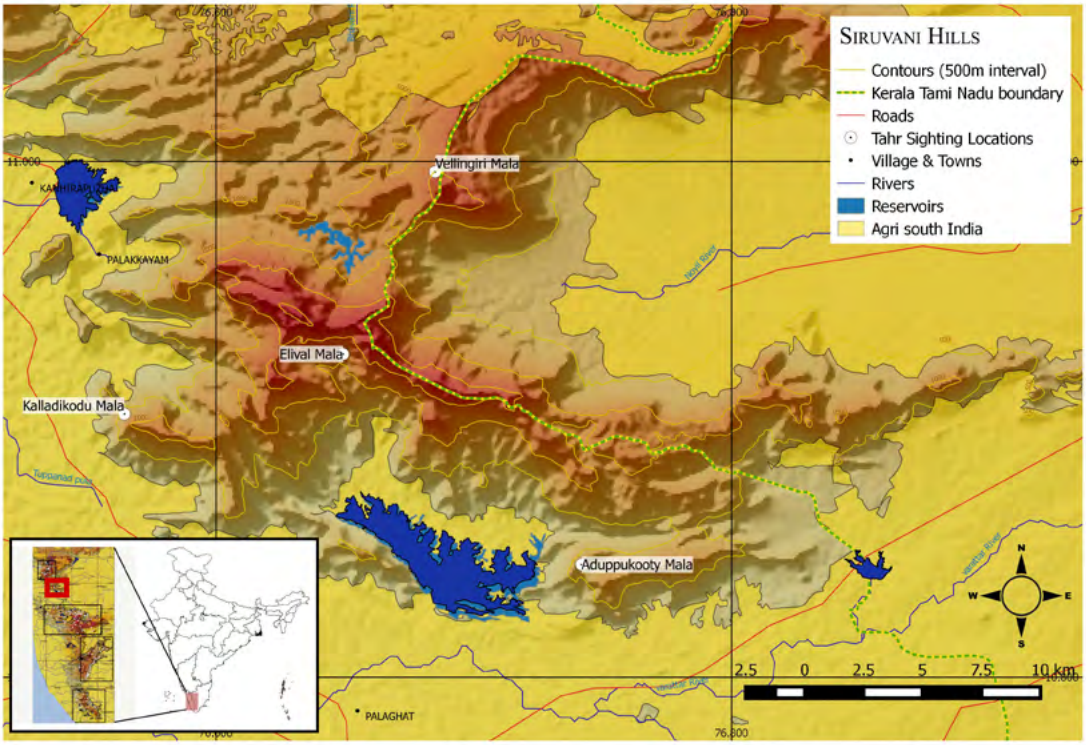
Threats:

Poaching in the area has now declined due to enhanced protection levels. NTFP collection, such as *Accacia concinia* (Shikakai) and *Phoenix humilis* (Broom grass) is being carried out by the tribal people. The forest is set on fire to facilitate easy collection of Shikakai fruits, which in turn affects the adjoining grasslands as well. Broom grass collection reduces the habitat use by the animals during the collection season.

[2] SIRUVANI HILLS

The Siruvani Hills, stretching from the southern part of the Nilgiri Hills to the northern part of the Palghat gap, form another independent cluster of tahr populations. These hills include the tahr areas of the Coimbatore Forest Division, Palghat Forest Division and part of the Mannarkad Forest Division.

Figure 3: Map showing Siruvani hills with potential tahr habitat and tahr sighting locations



Coimbatore Forest Division

The Coimbatore Forest Division has several areas with suitable tahr habitat. The following areas were surveyed – Chinna Aatumalai, Kunjra Mudi, Vellingiri Malai and Kurudi Malai. The presence of tahr was observed in only two locations – Chinna Aatumalai and Kunjira Mudi – while no tahrs were observed in the other two locations. (Please see Table 2, Appendix I for survey details.)

(A) PALGHAT FOREST DIVISION

The Palani Hills located in the south of Palghat gap forms a good tahr habitat. Five different locations in this area were surveyed. The population size and age-sex ratio are provided in Table 2. Tahrs were sighted in

all locations except for the Mullan malai, though indirect evidence was seen there as well.

(B) MANNARKAD FOREST DIVISION

Part of the Mannarkad Forest Division comes within the Siruvani Hills tahr habitat. The two areas that were surveyed did not yield any direct sighting of the tahr, though indirect evidence was recorded.

Threats in Siruvani block:

Poaching and marijuana (*Cannabis sativa*) cultivation are two direct threats to the tahr and their habitat. Since this forest area falls under multiple jurisdictions, poachers and marijuana cultivators escape to another when patrolling is intensified in one. More co-ordination that includes joint patrolling and sharing of information between multiple agencies is required

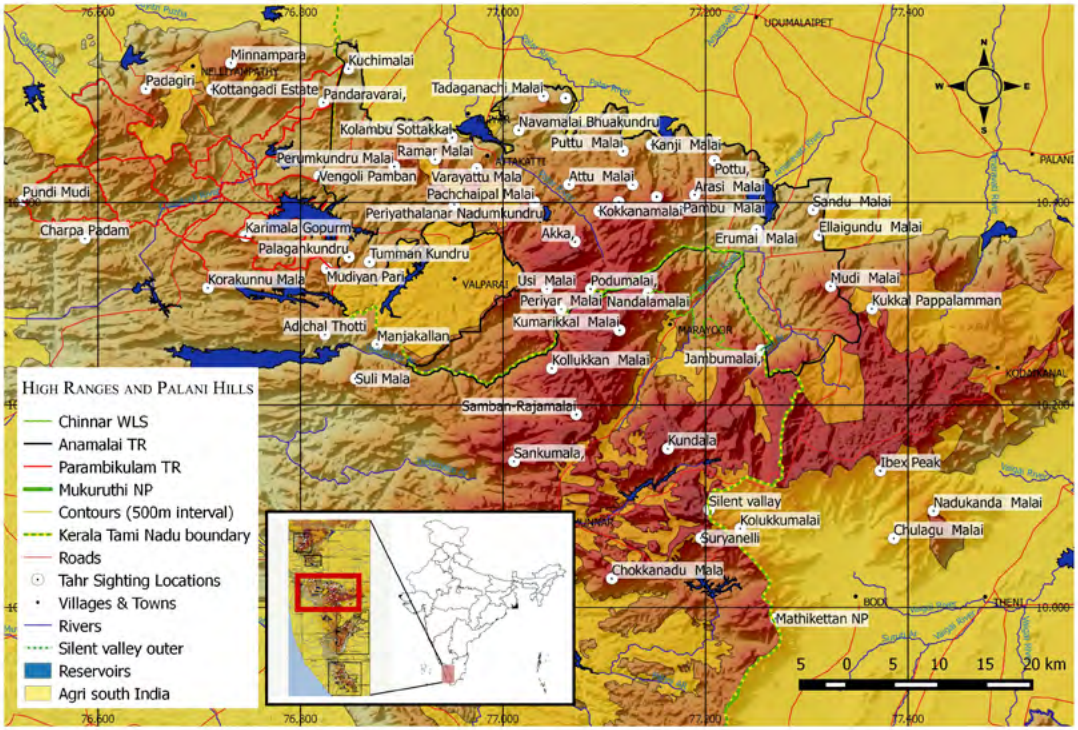
[3] HIGH RANGES AND PALANI HILLS

The Anamalai-Palani Hills include tahr populations in Nenmara Forest Division, Anamalai and Parambikulam Tiger Reserves, Munnar Hills, Eravikumam and Palani-Kodaikanal Hills. Beyond this, there is a break along the Theni Forest Division till the Periyar-Megamalai-Rajapalayam Hills. The tahr population in Eravikulam has been well-studied by many people and a fair amount of knowledge on the species is available (Rice, 1988, 1984). The forest department has used outer bound count to estimate tahr population for over a decade during the annual monitoring of the park. We rely on this data for the current population status, which is around 700 tahrs in Eravikulam. This block is the largest conservation unit, with the highest tahr population in all the blocks studied. Though this block seems to have some ecological barriers (plantations of eucalyptus and wattle), there is no physical barrier disconnecting the linkage between populations. (Please see Table 4, Appendix I for details.)

Nenmara Forest Division

Suitable Nilgiri tahr habitat, comprising montane grasslands and shola forests, begins near Kaikatty at Kesavampara and continues up to Karappara over a mountain called Hilltop. Development, which is inimical to conservation, should not be allowed to make inroads into this area. If strictly protected from poaching, this area can easily support a minimum population of 200 Nilgiri tahrs. While on the survey near Minnampara, 27 tahrs were seen.

Figure 4: Map showing potential tahr habitat and tahr sighting locations in Anamalai-Palani Hills



(A) ANAMALAIS AND PARAMBIKULAM

The Anamalai Tiger Reserve with Parambikulam complex was surveyed. In the Anamalai Tiger Reserve, a total of 107 individuals (in only 6 surveyed areas) and in Parambikulam, 19 individuals were recorded by our team while Davidar (1978) estimated 598 tahrs in this complex. Another survey of these habitats in 1994 estimated between 570 and 690 individuals (Mishra and Johnsingh, 1998).

Fewer areas could be surveyed in the present effort. Larger area coverage than in the current study will give a better estimate for the area. The results we provide are basic minimum numbers and can be used for future comparisons.

Threats:

Several tribal and non-tribal villages are present inside the Tiger Reserve in the Anamalais. The use of snares, poaching and frequent fires are major threats to the tahr population. The local people also collect NTFP but this may not be a direct threat as such, though it might be correlated with setting up of snares and poaching. The Parambikulam Tiger Reserve is relatively secure in terms of protection due to an active patrolling system. A few tribal villages here collect honey and NTFP, which, if unregulated, could disturb the tahr habitat during collections.

(B) CHINNAR WILDLIFE SANCTUARY

There are no earlier records for the presence of Nilgiri tahrs in the Chinnar area except for one report that indicated three individuals (Abraham et al., 2006). In our study, we recorded 33 individuals from 3 different locations in the sanctuary. We did not record any direct sightings at Jambumalai, but indirect evidence shows the presence of tahrs.

Threats:

Periodically set fires remain a threat here, as it eliminates large amounts of the above-ground biomass every season. Periodic cool season burning can reduce the hazards of summer fires. The sanctuary is otherwise protected from all other threats.

(C) MUNNAR

This area was described as lesser-known plateau of the high ranges by Davidar (1978). In his study, Davidar recorded around 30 individuals in this region. Another study by Abraham et al., (2006) recorded 124 individuals in Meeshapuli and Gundumallay. Gundumallay comprises the lower area of Tirthamalai, Tirthamalai, and Kundale talai malai. In our study, we recorded a total of 135 Nilgiri tahrs in the same region.

Threats:

The Meeshapuli malai and the Manna malai areas of the Munnar region are presently under the control of the Kerala Forest Development Corporation and not under the control of forest department. This region has a healthy tahr population. However, monoculture plantations, created on these grasslands to generate revenue for the Corporation is reducing tahr habitats. Unregulated tourism and trekking in this area also poses a threat. Fire, either deliberate or due to negligence by people from the surrounding tea estates, is another potential threat to tahrs.

(D) KODAIKANAL FOREST DIVISION

The Kookal area of Kodaikanal was surveyed and one population with 25 individuals was sighted. Arul and Bala (1998) also recorded tahr presence in this region.

Threats:

Extensive monoculture and cultivation of Marijuana has considerably reduced this tahr habitat, poaching also poses a major threat. Illegal collection of eucalyptus leaves and distillation of its oil inside the forest division is also a source of disturbance.

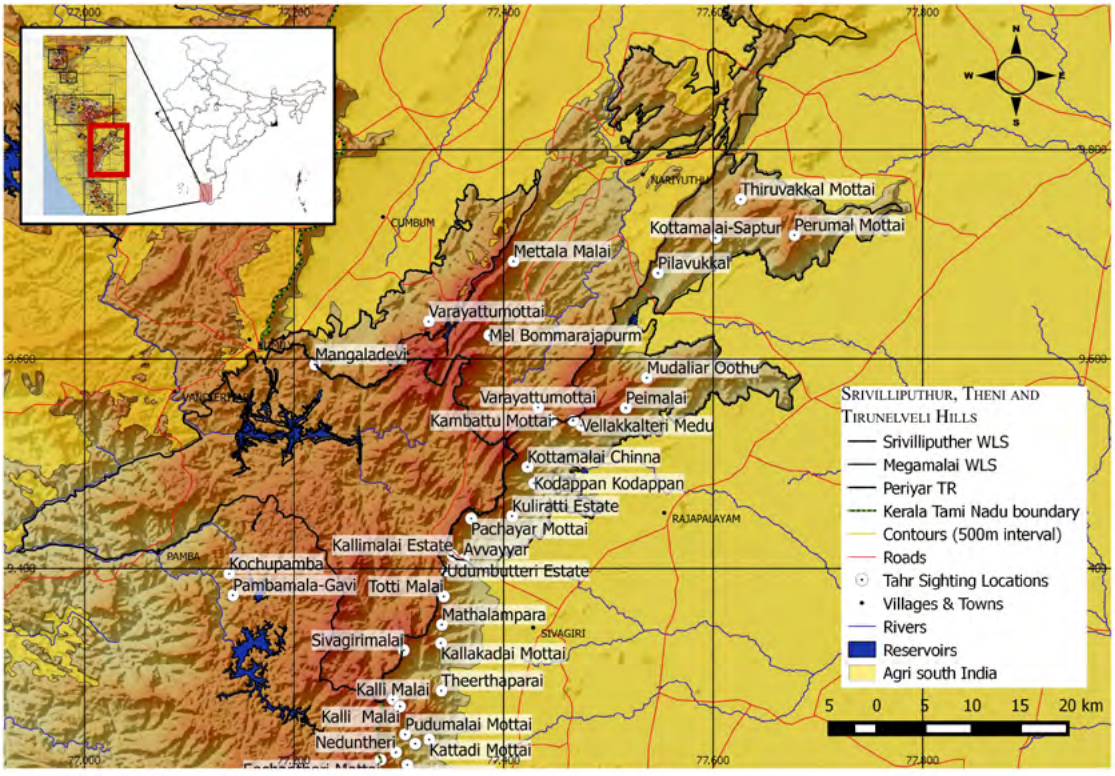
(E) VAZHACHAL AND MALAYATOOR

The Varaiadu Mudi of the Vazhachal division is a tahr habitat. Though it seems like an isolated pocket, it has some connectivity with other tahr areas of the Nelliampathi Wildlife Sanctuary. This study recorded only indirect signs of tahr here. During a trek to the area in 2011, personnel from the Kerala Forest Department saw 3 individuals in the locality. This confirms the presence/seasonal movement of a small herd in the area. Tahr habitats in Malayatur (Sulimala and Meenuliyan regions) were surveyed but recorded no signs of tahrs during the recent survey. This area is not connected to other tahr habitats and also has high anthropogenic pressures from the surrounding tribal villages for NTFP collection.

[4] SRIVILLIPUTHUR, THENI & TIRUNELVELLI HILLS

This block comprises of Theni Forest Division, Megamalai Wildlife Sanctuary, Grizzled Giant Squirrel Wildlife Sanctuary, Periyar Tiger Reserve, Ranni Forest Division and the newly notified Nellai Wildlife Sanctuary (Figure 5). (Please see Table 5, Appendix I for details.)

Figure 5: Map showing potential tahr habitat and tahr sighting locations in Srivilliputhur, Theni & Tirunelvelli Hills



(A) THENI FOREST DIVISION AND MEGAMALAI WILDLIFE SANCTUARY

This is a territorial division situated in the south-western Ghats between 9.620 and 10.100 north and between 77.410 and 77.480 east. It has an area of 863.85 km2 of which 140 km2 is proposed as the "Megamalai Wildlife Sanctuary". It has 8 ranges, namely Theni, Bodi, Uthamapalayam, Chinnamanur, Cumbam, Gudalur, Megamalai and Varushanad. This Forest Division shares its boundaries with the Kodaikanal Forest Division in the north, Munnar Forest Division in the west, Periyar Tiger Reserve in the south, Grizzled Giant Squirrel Wildlife sanctuary in the southeast and the Madurai Forest Division in the north-eastern side. This study identified a few new tahr areas within this division (see Table 7). E.R.C Davidar conducted field surveys in these areas including Padikattu metla (20 tahrs), Mudal Metla (27 tahrs), Varayattu Mottai/Venniar (16 tahrs) and Attu mottai (9 tahrs), (Davidar, 1978). Rice estimated around 100 tahrs in the High Wavy mountains (Davidar, 1978 and Rice, 1988c).

Threats:

Poaching is a major threat in this sanctuary, specifically in Varaiaatu mottai and Aatu mottai. Phoenix humilis (Broom grass) collection also affects the tahr habitat.

(B) PERIYAR TIGER RESERVE AND RANNI FOREST DIVISION

Abraham et al. (2006) estimated around 12 Nilgiri tahrs in Mangaladevi and about 22 in the Kochupamba area. However, even after three survey trips to Mangaladevi, our team was only able to sight three tahrs in the area. Kochupamba showed enough indirect evidence of tahr presence but no direct sightings were recorded. These areas need to be studied more extensively to get a better idea of the actual tahr population.

(C) GRIZZLED GIANT SQUIRREL WILDLIFE SANCTUARY

The Grizzled Giant Squirrel Wildlife Sanctuary was mainly created to protect the biodiversity of the area, specifically the Grizzled Giant Squirrel (*Ratufa macroura*). The Sanctuary shares its boundaries with the Megamalai Wildlife Sanctuary in the northeast and Periyar Tiger Reserve in the southeast, which together forms a contiguous forest patch. The sanctuary is located between 9°21' to 9°48' north and 77°21' to 77°46' east, covering an area of 410 km2. The region's deep valleys, large rocky section and steep cliffs form an ideal tahr habitat.

A total of 28 patches of grassland were surveyed within the Sanctuary. The survey yielded 125 individuals in the entire area. In certain locations, even though direct sightings were not recorded, indirect evidence (pellets) indicated the presence of tahr. At several locations, males were seen either alone or in pairs.

Threats:

1. Fire

The incidence of fire was observed in all areas except in Veilankal (Srivilliputhur range) and Kothapanvarai (Rajapalayam range). Fires are mostly set by people for various reasons, such as to clear paths to temples, to get tender fodder for cattle, marijuana cultivation and also for poaching.

2. Cattle grazing

Cattle-grazing was observed in high frequency in Thirugakal-Korapadi and Sulivarai/Vengaisilambu mottai of the Saptur range. People bring their cattle and camp in these areas during the dry season (Feb–May) when the forage is scarce in the plains. Goats are also grazed in the tahr habitat. Livestock presence could increase the risk of foot-and-mouth and other diseases to wildlife. Poachers can easily accompany the grazers.

3. Non-Timber Forest Produce Collection (NTFPC)

In areas such as Pudavukal, Perumalsamy mottai, Konavengai medu, Mayandikadai medu and Varaiattu mottai of Theni, collection of broom grass is carried out. Additonally, the "Haritaki" fruit (from the *Terminalia chebula* tree) is harvested in the Pudavukal and Perumalsamy mottai areas while amla (*Phyllanthes emblica*) collection is recorded in Kallakuli (*Kambathu mottai*). "Kallakurnji" is collected in Kuliratti mottai for medicinal purposes. These collections occur seasonally in the tahr habitat or its adjoining areas. Tahrs tend to avoid these areas during the collection months, presumably due to high anthropogenic disturbances.

4. Poaching

Evidence of poaching of the Black Naped Hare and the Indian Porcupine was found in the Thirugakal area. Locals also mentioned leopard poaching.

5. Sacred places

There are several sacred places in the Nilgiri tahr habitat and its adjoining areas. Thousands of people visit these areas every year causing a major disturbance to the habitat. These can be accompanied by poaching.

(D) TIRUNELVELLI HILLS

Only a few areas in the Tirunelveli Forest Division were surveyed. No direct sightings of tahr were obtained in the survey area although one site offered indirect evidence in the form of tahr pellets. These hills are reported to have nearly 40 potential locations to support tahr (Easa, et al., 2011). The present study could cover only a few of these locations. All other potential tahr areas should be surveyed to know the exact population status in the whole division.

Threats:

Broom grass collection seems to be a threat in this area. Fire also remains a threat resulting in a shrunken tahr habitat for a considerable part of the year.

[5] KMTR AND ASHAMBU HILLS

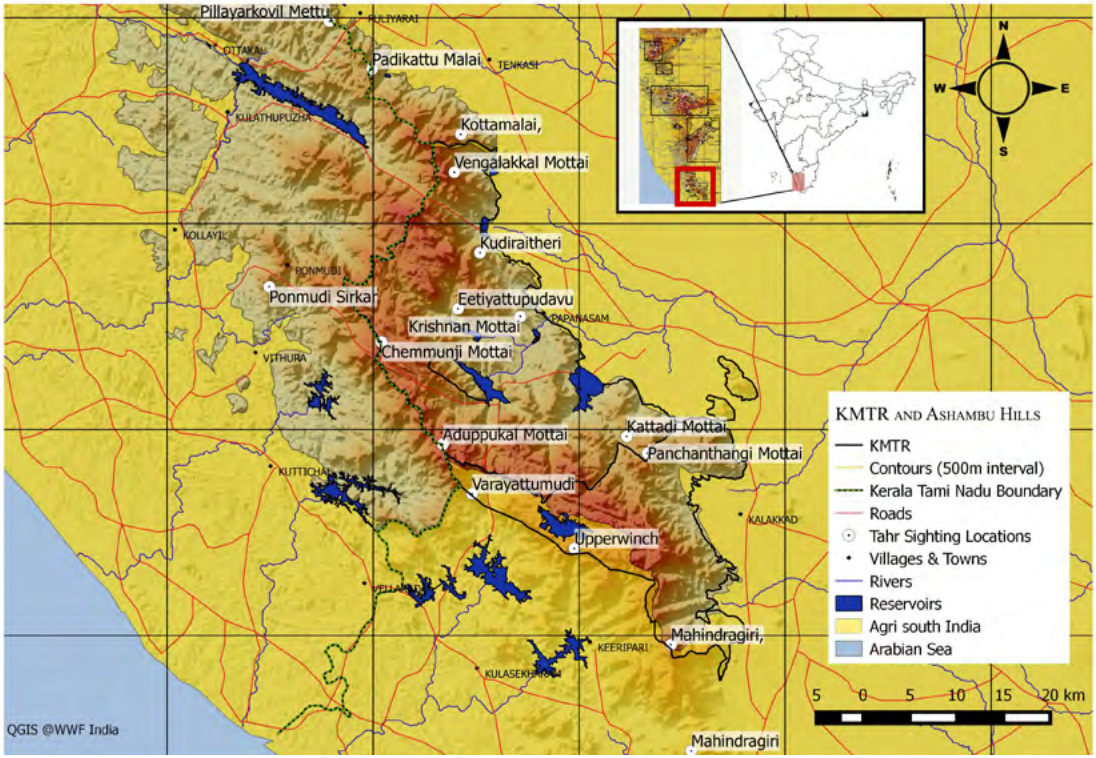
Potential tahr areas were surveyed in the Kalakkad-Mundanthurai Tiger Reserve. Field surveys were conducted in the Panjamthangi Mottai, Nandoothu Mottai and Varaiattu Mottai areas within the Mundanthurai Division of the Kalakkad Mundanthurai Tiger Reserve. Johnsingh (2015) visited Panjamthangi twice but did not see any tahrs here.

Davidar reported that 6 Nilgiri tahrs were seen by his assistant at Panjamthangi in 1977 and estimated a population of around 20 individuals in this area. Kuvattatti Mottai, locally known as "Varaiaatu Mottai", has a peak elevation of 1,050 m. The Nilgiri tahr was subsequently wiped out from here as people had easy access to the habitat resulting in considerable disturbance (Davidar, 1978).

Surveys of the Nandoothu Mottai and the Kuvattatti Mottai or Varaiaatu Mottai have resulted in zero tahr sightings. Information from the local forest dwellers and anti-poaching teams revealed that no tahr have been seen in these areas in the last 20 years.

These areas have coarse and tall grassland vegetation. Cliff habitats are also fewer in Panjamthangi Mottai. However, there is a small area with steep cliffs on the Nandoothu Mottai and on the eastern side of Nali varai. These grasslands are surrounded by moist and evergreen vegetation. Almost all the habitat features here suggest that these were once tahr habitats. If the current thriving populations in the Kodayar areas (on the southern side of these hills) are well-protected, these grasslands can be potentially colonized. No major threats were recorded in the reserve because the protection status is good. If protection from poaching is maintained and if the grasslands are managed by cool season burning, the Upper Kodayar-Thiruvannamalai-Agastyamalai landscape can easily have a minimum population of 500 tahrs. The reintroduction of tahrs in the Thirukurungudi Range (the primary area being the Kottangathatti and Kannuni Hills) – a proposal that was approved by the National Board for Wildlife on 31 October 2012 – should be carried out as urgently as possible. (Johnsingh, 2015.) (Please refer to Table 6, Appendix I for details on abundance and population structure.)

Figure 6: Map showing potential tahr habitat and tahr sighting locations in KMTR and Ashambu Hills



4.2 IDENTIFIED NEW AREAS FROM OUR STUDY

We identified 17 new tahr habitats during these surveys that had no prior records for the presence of tahr (Figure 7). A total of 131 tahrs were recorded for all the new areas put together.

Figure 7: New tahr populations discovered during WWF-India surveys. Boundaries of the protected areas and maior rivers are also shown.

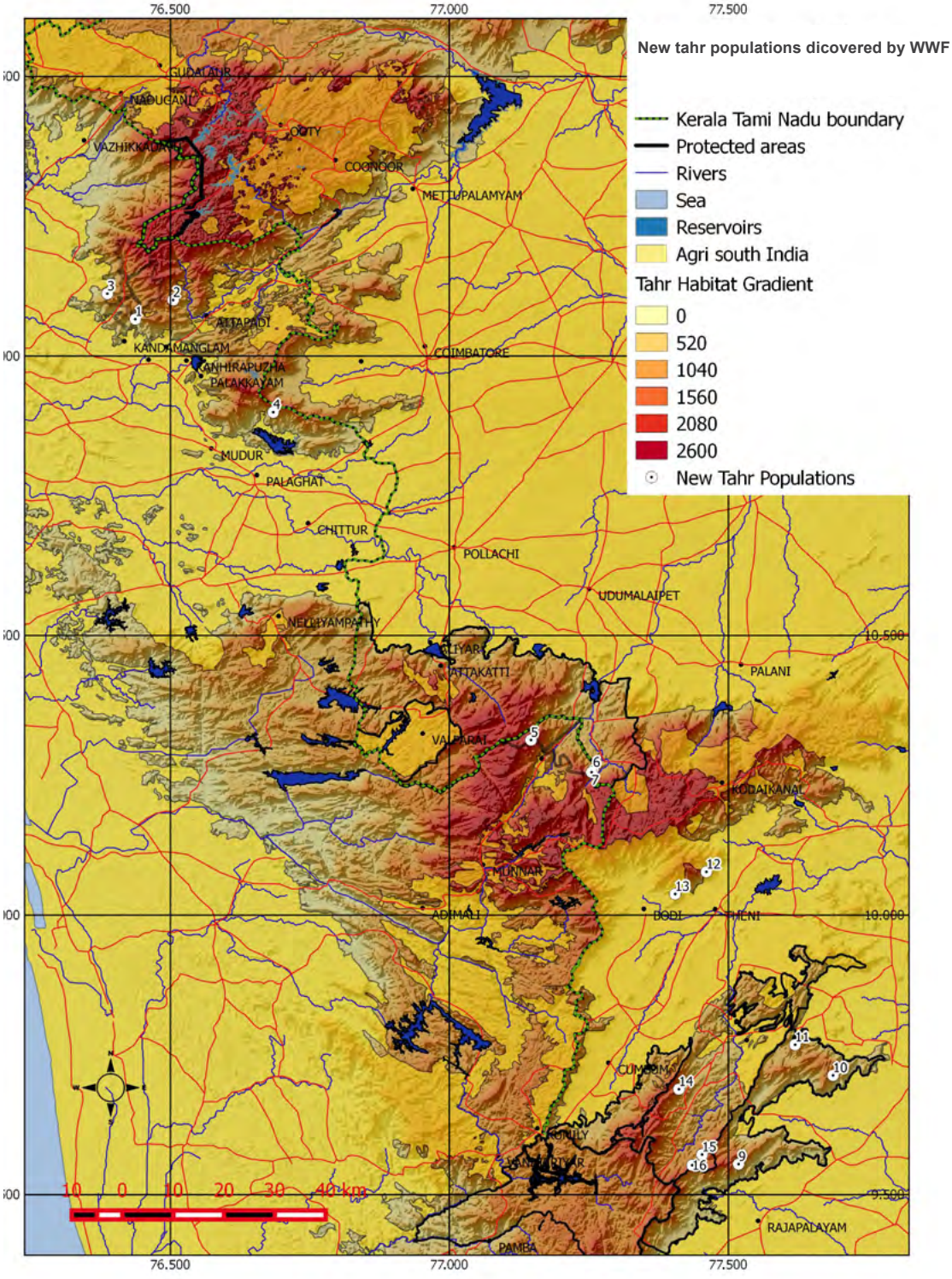


Table 2: New tahr populations discovered in the current study

Forest Division	Area	Count
Silent Valley NP	Pathrakadavu	4
	Aatumudi	1
	Koomban	8
	Madamudi	2
Palghat FD	Aatumalai	35
Chinnar WLS	Nandalamalai	15
	Kasimalai	7
	Chengamalai	11
Munnar FD	Chokramudi	10
Grizzled Giant Squirrel WLS	Kunvengai Mottai	5
	Naaraimoonji Mottai	5
	Sulivarai/ Vengaisilambu	5
Theni FD & Megamalai WLS	Vasakku Malai	1
	Marakkal Malai	9
	Attiuttu Malai	9
	Above Kunderi	3
	Nagamalai	1
Total		131

4.3 MAJOR ISSUES AFFECTING TAHR CONSERVATION

During the course of the field surveys, field teams evaluated the issues and threats to Nilgiri tahr survival in the area. The following issues are based on preliminary and largely anecdotal assessments and should be followed by detailed, more quantitative assessments.

1. ISOLATION AND SMALL POPULATIONS:

There are only a few large populations of Nilgiri tahr that are suited for even short-term conservation. Using the population viability assessment for the feral goat (*Capra hircus*) as an example, a minimum of 437 individuals would be required for ensuring population viability over 100 years, while 1,261 individuals would be required for the population to remain viable over the next 40 generations (Brook et al 2006). There are many populations that comprise less than 20 individuals and such populations are prone to inbreeding and other stochastic extinction threats (See Table 1). With appropriate management interventions, some of the smaller populations can potentially expand as large habitats are available to allow for expansion. Habitat connectivity needs to be urgently assessed and linkages secured to ensure that isolated populations are connected wherever feasible.

2. VULNERABILITY OF SMALL HABITAT PATCHES TO HUMAN DISTURBANCES:

Several smaller populations (and also some large populations) are exposed to human disturbances in the form of cattle-grazing, fuel-wood collection, illegal tourism and people transiting through their habitat for various other reasons. All these contribute to stress and reduced access to foraging areas during the day. There is a need to regulate those activities to minimize disturbance to the Nilgiri tahr.

There is a need to develop a mechanism for patrolling these areas to prevent poaching and regulate human use. The option of developing some of these areas as Community Conservation Areas or reserves should be explored if local communities can be convinced and benefitted.

3. DISEASE AND COMPETITION

The presence of livestock poses a direct threat to tahr as it can lead to the spread of diseases from livestock to wild herbivores. Livestock also potentially compete with tahr for food and such knowledge gaps should be addressed with appropriate studies.

There can be competition for water during the summer, specifically in areas where tahrs occur at lower altitudes. The cattle camps can also become attractive places for poachers to operate from. These issues, especially the potential competition between livestock and tahr, as well as disease transfer should be addressed through further studies.

4. POACHING

During the survey, snares and old camping sites were seen in the Nilgiri tahr habitats. Information gathered from local people also suggested that poaching still remains a threat to tahr conservation. Given their small population size, this poses a serious problem.
There is a need to develop a protection mechanism that involves local communities for information gathering, monitoring and protection of tahr.
Free ranging dogs also pose a threat to tahr as they can hunt tahr or deprive it access to foraging areas.

5. HABITAT LOSS, DEGRADATION AND FRAGMENTATION

Invasion of the habitat by exotic species is reducing the area available to the tahr. For instance, the Kudukkadi Betta of the southern Nilgiris and Nandala Malai of Chinnar Wildlife Sanctuary are becoming fragmented due to exotics.
The conversion of tahr habitats for human use and increasing anthropogenic pressures are resulting in habitat loss and fragmentation.

6. FIRE

Whether fire is a threat or a habitat management tool has always been a matter of debate. Fire could be considered a threat, when its intensity is high. While uncontrolled fires every year could result in a change in species composition (making some of the plant species locally extinct, and causing a proliferation of fire-resistant species), controlled burning with low intensity of fire (fires set in pre-dry season) is known to increase new tender growth and soil nitrogen. It also helps in reducing standing dead grass materials (litter) which are non-edible in such condition. However, an uncontrolled fire in summer (which is the case in most areas, except in Eravikulam where fire management is followed) will be detrimental to the tahr and other herbivores using the area.

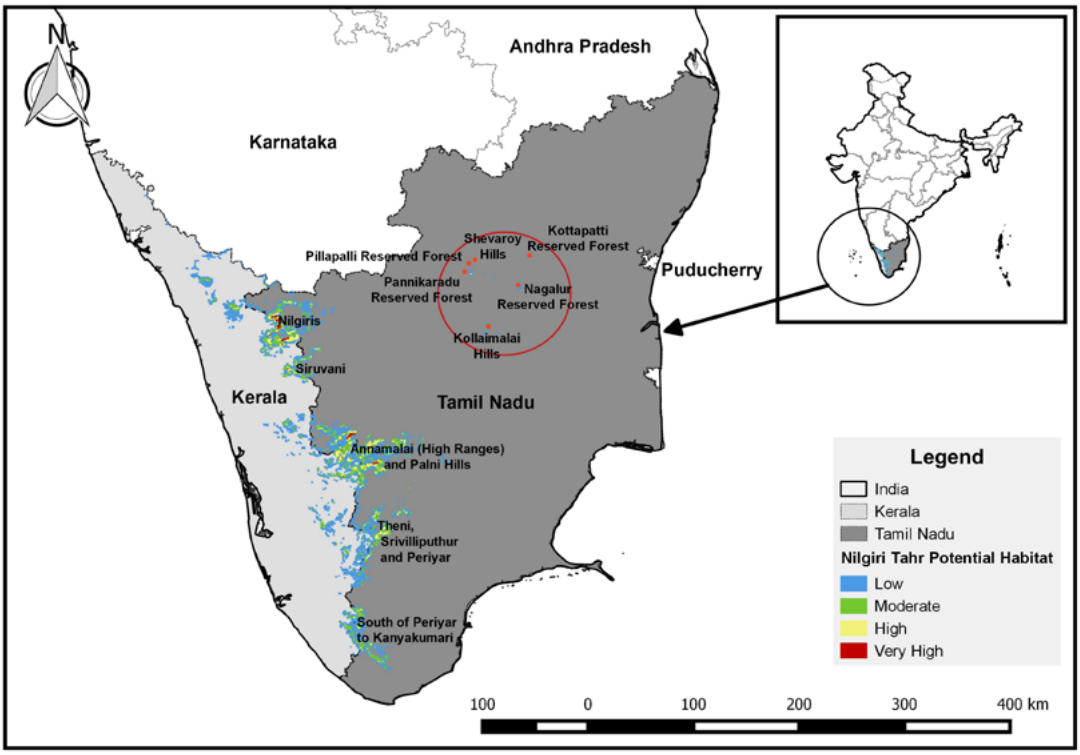
4.4 POTENTIAL HABITAT EXTENT OF THE NILGIRI TAHR IN THE WESTERN GHATS

Nilgiri tahr is endemic to the Western Ghats and historically the range of the species extended up to Bramhagiri Hills in Karnataka to the north and into Kerala and Tamil Nadu to the south (Shackleto 1997). Presently however, its distribution is restricted to the Nilgiri Hills and the southern parts of the Western Ghats within Kerala and Tamil Nadu (Alempath and Rice 2008). The Nilgiri tahr is categorised as Endangered (C2a (i) ver 3.1) according to recent assessments by IUCN (Alempath and Rice 2008). Easa et al. (2010) proposed that the potential extent of the tahr habitat in Annamalai and Periyar are 310 km^2 and 159 km^2 respectively.

However, despite the Nilgiri tahr's endangered status and high endemism, few studies have been taken up to assess the extent of its potential available habitat across their present range in Tamil Nadu and Kerala. With this backdrop, the present evaluation was undertaken to evaluate the potential habitat extent of this species in the Western Ghats.

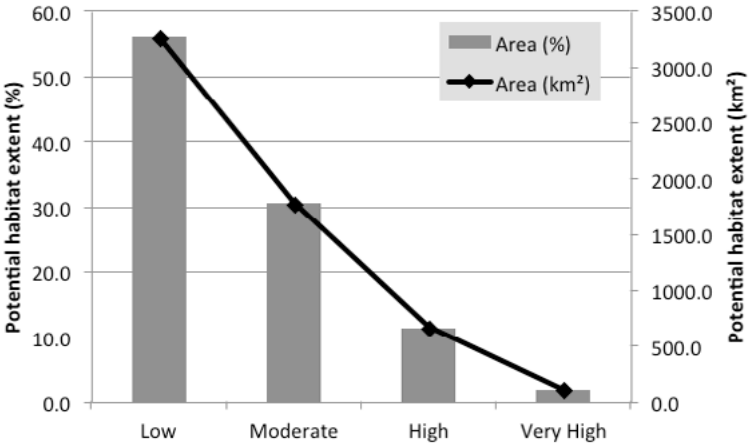
75 Nilgiri tahr occurrence points were fitted into the GIS domain and their potential habitat was evaluated against 8 environmental variables using Maximum Entropy (or MaxEnt) modelling framework (Phillips et al., 2006). The species occurrence information was collected from 5 habitat complexes across Tamil Nadu and Kerala, namely the Nilgiris, Siruvani, Annamalai and Palni Hills, the Theni, Srivilliputhur and Periyar complex and the areas south of Periyar. The environmental variables used for the estimation included altitude, slope, one bioclimatic variable (bio18), absolute evapo-transpiration, land cover, NDVI or Normalized Difference Vegetation Index (NDVI), as well as aspect and proximity to water sources.

Figure 8: Habitat suitability map of Nilgiri tahr in Kerala and Tamil Nadu. No tahrs have been reported from the area marked in the red circle.



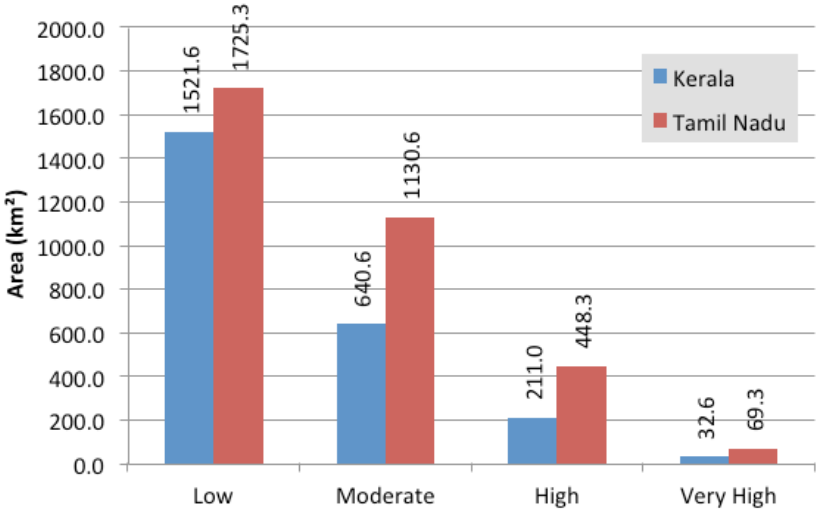
The present model predicts c 5790 km² of habitat suitable for Nilgiri tahr across Kerela and Tamil Nadu (Figure 8). Though the model predicts occurrence of habitat with potential to harbour Nilgiri tahr around Nagalur Reserve Forest, Pannikaradu Reserve Forest and Kollaimalai Hills of Tamil Nadu, the species has never been reported from these areas and hence this area does not form part of the species range. Nilgiri tahr is strictly restricted to the Western Ghats and the total extent of predicted species habitat here is c. 5713.8 km². The species habitat ranged between 250 m and 2500 m in altitude and probability of encountering the species increases between 2000 m and 2500 m. Approximately 56.2% of the predicted habitat is of low potential, c. 30.6% of medium potential, 11.8% of high potential and 1.8% is of very high potential (Figure 2). In the Western Ghats the species habitat is distributed across five complexes such as – Nilgiris; Siruvani; Annamalai and Palni Hills; Theni, Srivilliputhur and Periyar complex; and areas south of Preiyar.

Figure 9: Bar graph showing extents of low, moderate, high and very high potential habitat of Nilgiri tahr in the Western Ghats



Approximately 58.3% of the total Nilgiri tahr habitat falls in Tamil Nadu and 41.6% in Kerala. Percentage extent of low moderate, high and very high potential Nilgiri tahr habitat in Tamil Nadu are c. 51.0 %, 33.4 %, 13.3 % and 2.1 % respectively (Figure 3). In Kerela, however, c. 63.1 % of the predicted Nilgiri tahr habitat is of low potential, c. 26.6% of medium potential, while the extent of high and very potential habitats are 8.8 % and 1.4 % only (Figure 3).

Figure 10: Bar graph showing extents of low, moderate, high and very high potential habitat of Nilgiri tahr in Tamil Nadu and Kerala



Keeping in mind the species ecology and its preference for rugged, cliffy terrain, the habitat classified as low potential may not be suitable for tahr and thus the total tahr habitat including the medium, high and very high quality habitat would be only about 2,500 km^2. High and very high quality habitats comprise only 777 km^2, highlighting the urgent need for securing the existing populations of this species.

5. MEASURES UNDERTAKEN TO ENABLE TAHR CONSERVATION

5.1 CAPACITY BUILDING:

Training of the forest department, NGOs and other stakeholders to carry out tahr census was undertaken under this project. Special emphasis was placed on the training of officials from Mukurthi National Park. A presentation on the findings about the Nilgiri tahr status and conservation efforts was also made to 56 foresters in the Forest Training school in Malayar.

In every habitat block, local NGOs were approached and trained to do future monitoring of tahr. After the completion of this survey across the entire Nilgiri tahr habitat, and from the lessons learned, plans for a multi-agency collaborative census with proper methodology (double observer sampling) to estimate the current status of the Nilgiri tahr was put in place.

5.2 COMMUNITY/STAKEHOLDERS INVOLVEMENT:

A conservation alliance was also established with the local NGOs and stakeholders including local communities. An alliance with WAR (Wildlife Association of Rajapalayam) was also initiated to protect the Nilgiri tahr in the Rajapalayam areas.

6. THE WAY FORWARD

6.1 ADDRESSING AND ASSESSING KEY THREATS

A detailed quantitative assessment of all the potential threats to the Nilgiri tahr should be carried out to understand the nature and extent of anthropogenic pressures, habitat degradation, habitat fragmentation and poaching in order to prepare a mitigation strategy. Meanwhile, some of the threats that have been highlighted in this report should be addressed to secure the exiting tahr populations

a. Isolation of small populations:
This needs to be addressed by assessing the genetic and habitat linkages between tahr populations, expanding the current habitat of tahr by arresting habitat degradation, and active habitat management.

b. Vulnerability of small habitat patches to human disturbances:
This could be addressed by encouraging community-based conservation planning, better patrolling to curb illegal activities, and continuous monitoring of these populations.

c. Disease and competition:
There is a need to assess the livestock-grazing pressures, potential competition between tahrs and livestock and disease transfer between the two so as to able to suggest and formulate appropriate conservation actions.

d. Poaching:
Better training and equipment for Forest Department staff and joint patrolling with communities are required to reduce poaching.

e. Habitat loss, degradation and fragmentation:
Potential change in land use, which can further fragment tahr populations, should be controlled. A tahr conservation plan should address this issue for long-term solutions and policy interventions. Another major threat that needs immediate action is the habitat degradation due to proliferation of invasive species.

f. Fire:
Only controlled burning should be permitted until the role of fires in habitat management for the tahr is better understood. Serious attention should be paid to accidental and deliberate fires and these should be controlled by establishing better detection and control mechanisms in collaboration with the local communities.

6.2 PREPARING A TAHR CONSERVATION PLAN

All the existing knowledge on Nilgiri tahr should be collated and reviewed and an adaptive conservation management plan for tahr should be prepared to serve as a policy and vision document for their conservation. The tahr conservation planning needs to be done at multiple spatial scales to devise appropriate conservation actions at the scale of (i) entire distributional range (ii) the individuals blocks of habitat highlighted in our study and (iii) individual populations.

6.3 STRENGTHENING THE NILGIRI TAHR ALLIANCE

The Nilgiri tahr Alliance is a group of people that includes various stakeholders such as tahr experts, tahr area managers, local NGOs and individuals. This alliance needs to be strengthened so that conservation actions can be implemented properly. The alliance can also play an important role towards regular monitoring of the tahr and can facilitate the conservation planning in different landscapes.

6.4 ENCOURAGING FURTHER APPLIED RESEARCH

It is crucial that the conservation of the endemic Nilgiri tahr is backed by scientific conservation actions. Some of the immediate research needs include –

a. A better understanding of habitat use and habitat needs of the tahr.

b. A Population and Habitat Viability Analysis (PHVA) to determine the long-term conservation potential of different-sized and connected populations and to determine the best options for connecting and conserving the isolated populations.

c. Meta-population management strategies and tools to implement tahr conservation since habitat fragmentation and isolated populations seriously hamper the long-term survival of the tahr.

d. Assessment of the genetic diversity and connectivity of the tahr population in different regions.

6.5 REINTRODUCTION OF THE TAHR TO PARTS OF THEIR ORIGINAL RANGE

It is possible to reintroduce the tahr to parts of their original range with improved habitat management and protection. There are still enough tahr numbers in the wild and these can be used to repopulate the potential habitats from where tahrs have disappeared. However, it is important to ensure that the threats which resulted in the initial decline should be mitigated before a reintroduction programme begins. (Please see Appendix III for details on potential sites for reintroduction.)

6.6 FURTHER SURVEYS

Combining our data with the Forest Department census brings the total population of the tahr to a much higher number than previously estimated. This is the first survey in which nearly the entire Nilgiri tahr habitat has been covered. Also, more intense field surveys and stronger focus on more rugged and inaccessible cliff habitats yielded higher tahr numbers in several sites than earlier reported. In addition to improving tahr survey methods, the emphasis should be on addressing the conservation concerns that our study has highlighted. Both short-term as well as long-term conservation strategies should be adopted to address the immediate as well as persisting threats.

A few areas in the Neliampathy Forest Division, Ashambu Hills, and a few potential areas in the Palghat, Munnar, Malayatur and Mannarkad divisions need to be surveyed. The Anamalais should also be surveyed, because a tahr census has not been conducted here in the last few years. Once these areas are thoroughly surveyed, a better understanding of the tahr distribution could be established. This eventually will add to population numbers now determined from the current study and provide a comprehensive understanding on the status of the Nilgiri tahr.

6.7 TESTING AND IMPLEMENTATION OF BETTER MONITORING PROTOCOLS

WWF-India has the technical capacity to test and implement a standard monitoring protocol for the Nilgiri tahr. It is important to go beyond the minimum numbers approach so that tahr estimates are comparable, replicable and allow for the detection of significant changes in population. The double observer sampling method that has been successfully applied for mountain ungulates (Forsyth and Hickling, 1997; Suryawanshi et al., 2012) or an even more simplified approach (Riddle et al., 2010) should be tested and adopted as a standard for all future monitoring of the Nilgiri tahr.

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8. APPENDIX I

Table 2: Tahr abundance and population structure in the Nilgiris Block

S. No.	Place	Location	Sb	Dbm	Lbm	Af	Yl	Y	Uc	Total	Ind. Ev.
1	Nilgiri peak base	Mukurthi National Park	2	1	5	11	6	6	2	33	
2	Mukurthi peak	Mukurthi National Park	1	0	1	6	3	2	1	14	
3	Devabetta	Mukurthi National Park	0	0	1	5	2	6	0	14	
4	China Mukurthi	Mukurthi National Park	0	3	4	14	5	10	0	36	
5	Pichal bettu	Mukurthi National Park	0	0	1	2	0	2	0	5	
6	Catchment-view point	Mukurthi National Park	2	1	3	16	2	6	2	32	
7	Catch-ment-Trek-king shed	Mukurthi National Park	1	1	4	13	1	5	0	25	
8	Catchment-No 2 dam	Mukurthi National Park	2	1	4	12	4	3	1	27	
9	Chettiparai	Mukurthi National Park	1	1	3	11	3	7	3	29	
10	Madipum-alai	Mukurthi National Park	2	1	0	3	0	0	1	7	
11	Nadugani mattom	Mukurthi National Park	1	1	1	4	4	6	6	23	
12	Nadugani east	Mukurthi National Park	2	1	2	10	3	12	21	51	

13	Karadiguhai	Mukurthi National Park	2	1	5	17	4	9	6	44	
14	Pandiar top	Nilgiri South Division	1	1	2	9	2	3	0	18	
15	Pecchakal bettu	Nilgiri South Division	0	1	2	11	8	3	0	25	
16	Kinnakorai slopes (Meekeri betta)	Nilgiri South Division	1	0	0	0	0	0	0	1	
17	Kudiakadu betta	Nilgiri South Division	1	0	1	2	2	0	2	8	
18	East Varagapallam	Nilgiri South Division	1	0	0	4	1	0	0	6	
19	West Varagapallam	Nilgiri South Division	1	2	13	0	3	0	16	35	
20	Mudimund	Nilgiri Gudalur Division	2	3	0	11	2	7	5	30	
21	Anguinda malai	Coimbatore Division	1	2	0	0	0	0	0	3	
22	Aatumudi	Coimbatore Division	0	0	0	1	0	0	0	1	
23	Pathrakadavu	Coimbatore Division	1	1	2	0	0	0	0	4	
24	Koomban & Madamudi	Coimbatore Division	0	0	0	0	0	0	10	10	
25	Nizhalmudi & Paravakulam	Coimbatore Division	0	0	0	0	0	0	0	0	Yes
26	Arugampara	Coimbatore Division	0	0	0	0	0	0	0	0	Yes
	Total		25	22	54	162	55	87	76	481	

Note: Sb- Saddle back; Dbm-Dark brown male; Lbm-Light brown male; Af- Adult female; Yl-Yearling; Y- Young; UC-Unclassified; In. Ev.- Indirect evidence

Table 3: Tahr abundance and population structure in Siruvani Hills Block

S. No.	Place	Location	Sb	Dbm	Lbm	Af	Yl	Y	Uc	Total	Ind. Ev.
1	Chinna Aatumalai	Coimbatore	0	0	0	1	0	1	0	2	
2	Kunjira Mudi	Coimbatore	0	0	0	0	0	0	0	0	Yes
3	Vellingiri Malai	Coimbatore	0	0	0	0	0	0	0	0	No
4	Kurudi Malai	Coimbatore	0	0	0	0	0	0	0	0	No
5	Aatumalai	Palghat	0	1	2	17	7	1	7	35	
6	Elival Malai	Palghat	0	2	0	14	4	3	1	24	
7	Palla Malai	Palghat	6	0	0	5	1	1	4	17	
8	Mullan Malai	Palghat	0	0	0	0	0	0	0	0	Yes
9	Ayyapan Malai	Palghat	3	0	1	9	0	4	6	23	
10	Mallesh-waran Mudi	Mannarga-hat	0	0	0	0	0	0	0	0	Yes
11	Attapadi slopes	Mannarga-hat	0	0	0	0	0	0	0	0	Yes
	Total		9	3	3	46	12	10	18	101	

Note: Sb- Saddle back; Dbm-Dark brown male; Lbm-Light brown male; Af- Adult female; Yl-Yearling; Y- Young; UC-Un-classified; In. Ev.- Indirect evidence

Table 4: Tahr abundance and population structure in Anamalai-Palani Hills

S. No.	Place	Location	Sb	Dbm	Lbm	Af	Yl	Y	Uc	Total	Ind. Ev.
1	Chokaramudi (Kurusumalai)	Munnar	0	1	1	0	1	1	6	10	
2	Meeshapuli & Mannamalai	Munnar	1	0	0	66	11	12	1	91	
3	Kolukkumalai	Munnar	1	0	0	0	0	3	43	47	
4	Tirthamalai Lower area	Munnar	0	0	0	1	1	0	0	2	
5	Tirtamalai (Valukkaparai)	Munnar	2	0	1	5	2	0	0	10	
6	Kundale Talai malai (Varaiaatu mottai)	Munnar	2	2	1	13	4	0	0	22	
7	Varaiyattu mottai (Churakuttan)	Munnar	0	0	0	0	0	0	0	0	Yes
8	Attakati-13 bend	Annamalai	1	0	2	5	2	1	0	11	
9	Varai attumalai	Annamalai	2	3	3	7	3	6	3	27	
10	Pachapal malai	Annamalai	2	2	0	13	3	12	10	42	
11	Yerumai malai	Annamalai	1	1	1	1	0	1	3	8	
12	Ellankundru	Annamalai	1	1	3	4	0	2	2	13	
13	Rasivarai	Annamalai	1	0	0	2	1	0	2	6	
14	Karimalai Gopuram	Parambikulam	0	0	0	0	0	0	0	0	Yes
15	Vengoli Peak	Parambikulam	0	0	0	0	0	0	0	0	Yes
16	Kuchimudi	Parambikulam	0	0	0	0	0	0	0	0	Yes
17	Pandaravarai	Parambikulam	1	1	0	5	2	2	8	19	
18	Jambumalai	Chinnar	0	0	0	0	0	0	0	0	Yes
19	Kasimalai	Chinnar	0	0	0	3	2	1	1	7	
20	Chengamalai	Chinnar	0	1	2	2	1	0	5	11	
21	Nandalamalai	Chinnar	0	2	2	6	0	1	4	15	
22	Kookal	Kodaikanal	3	0	0	10	5	4	3	25	
	Total		18	14	16	143	38	46	91	366	

Note: Sb- Saddle back; Dbm-Dark brown male; Lbm-Light brown male; Af- Adult female; Yl-Yearling; Y- Young; UC-Unclassified; In. Ev.- Indirect evidence

Table 5: Tahr abundance and population structure in Srivilliputhur, Theni & Tirunelvelli Hills Block

S. No.	Place	Location	N	Sb	Dbm	Lbm	Af	Yl	Y	Uc	Total	Ind. Ev.
1	Thirugakal – Korapadi	Sirivalliputtur	10	1	1	0	5	3	0	0	20	
2	Pudavukal	Sirivalliputtur	13	0	1	0	8	2	0	2	26	
3	Perumalsamy mottai	Sirivalliputtur	9	2	1	0	5	1	0	0	18	
4	Naaramoonji mottai	Sirivalliputtur	5	0	1	1	1	1	1	0	10	
5	Sulivarai / Vengaisil-ambu mottai	Sirivalliputtur	5	0	0	0	4	1	0	0	10	
6	Pechi mottai	Sirivalliputtur	1	0	1	0	0	0	0	0	2	
7	Kottamalai	Sirivalliputtur	0	0	0	0	0	0	0	0	0	Yes
8	Thanakkadi	Sirivalliputtur	8	1	0	1	4	2	0	0	16	
9	Thaliaruthan keni	Sirivalliputtur	0	0	0	0	0	0	0	0	0	Yes
10	Saralai mottai	Sirivalliputtur	1	1	0	0	0	0	0	0	2	
11	Kalumurinjan	Sirivalliputtur	0	0	0	0	0	0	0	0	0	Yes
12	Anaimutti	Sirivalliputtur	0	0	0	0	0	0	0	0	0	Yes
13	Pazhathottam (Peimala stretch)	Sirivalliputtur	1	1	0	0	0	0	0	0	2	
14	Kadavukal (Peimala stretch)	Sirivalliputtur	0	0	0	0	0	0	0	0	0	Yes
15	Kuruvikavu mottai (Peimala stretch)	Sirivalliputtur	7	1	0	0	2	1	0	3	14	
16	Peimala mottai	Sirivalliputtur	7	1	0	0	3	2	1	0	14	
17	Veilankal	Sirivalliputtur	7	1	1	1	4	0	0	0	14	
18	Manpudavumethu	Sirivalliputtur	6	0	0	0	4	2	0	0	12	
19	Chembarali mottai (Peimala stretch)	Sirivalliputtur	1	1	0	0	0	0	0	0	2	
20	Kuliratti (Peimala)	Sirivalliputtur	0	0	0	0	0	0	0	0	0	Yes
21	Konavengai medu	Sirivalliputtur	5	1	0	1	2	1	0	0	10	
22	Vellakaltheri medu stretch	Sirivalliputtur	2	2	0	0	0	0	0	0	4	
23	Kalla kuli (Kambthu mottai)	Sirivalliputtur	12	2	0	0	0	0	0	10	24	
24	Varaiattu mottai (Kota-malai)	Sirivalliputtur	11	1	0	1	4	3	0	2	22	
25	Kothapanvarai	Sirivalliputtur	1	1	0	0	0	0	0	0	2	
26	Easwaran thittu	Sirivalliputtur	0	0	0	0	0	0	0	0	0	Yes
27	Mayandikadai medu	Sirivalliputtur	1	1	0	0	0	0	0	0	2	
28	Kuliratti mottai	Sirivalliputtur	12	2	0	1	6	2	1	0	24	
29	Vasakku malai	Theni & Megamalai	1	1	0	0	0	0	0	0	2	

30	Nadukandan malai	Theni & Megamalai	0	0	0	0	0	0	0	0	0	No
31	Agamalai	Theni & Megamalai	0	0	0	0	0	0	0	0	0	No
32	Marakkal malai	Theni & Megamalai	9	1	0	0	1	1	0	6	18	
33	Metala malai / Padikattu mottai / Varaiattu mottai	Theni & Megamalai	9	3	2	1	2	0	1	0	18	
34	Bommarajapuram north	Theni & Megamalai	12	1	0	1	8	1	1	0	24	
35	Bommarajapuram south	Theni & Megamalai	0	0	0	0	0	0	0	0	0	No
36	Aatu Mottai	Theni & Megamalai	23	1	1	0	4	2	1	14	46	
37	Jothi estate stretch	Theni & Megamalai	5	1	1	0	2	1	0	0	10	
38	Spring heaven	Theni & Megamalai	0	0	0	0	0	0	0	0	0	Yes
39	Metla estate	Theni & Megamalai	0	0	0	0	0	0	0	0	0	No
40	Sallimuthan estate stretch	Theni & Megamalai	0	0	0	0	0	0	0	0	0	Yes
41	Varaiattu mottai (Poolamalai)	Theni & Megamalai	37	2	0	4	17	2	7	5	74	
42	Naga Malai	Theni & Megamalai	1	0	0	0	1	0	0	0	2	
43	Ibex cliff	Theni & Megamalai	0	0	0	0	0	0	0	0	0	Yes
44	Ibex peak	Theni & Megamalai	0	0	0	0	0	0	0	0	0	Yes
45	Atiuttu Malai	Theni & Megamalai	9	0	1	1	3	2	1	1	18	
46	Unjal	Theni & Megamalai	0	0	0	0	0	0	0	0	0	Yes
47	Kunderi	Theni & Megamalai	3	0	0	1	1	1	0	0	6	
48	Chulagu Malai	Theni & Megamalai	0	0	0	0	0	0	0	0	0	Yes
49	Togu Malai	Theni & Megamalai	0	0	0	0	0	0	0	0	0	No
50	Mangaladevi hills	Periyar Tiger Reserve	3	0	0	1	1	1	0	0	6	
51	Kochu pamba	Rani	0	0	0	0	0	0	0	0	0	
	Total		237	30	11	15	92	32	14	43	474	

Note: Sb- Saddle back; Dbm-Dark brown male; Lbm-Light brown male; Af- Adult female; Yl-Yearling; Y- Young; UC-Unclassified; In. Ev.- Indirect evidence

Table 6: Tahr abundance and population structure in KMTR and Ashambu Hills

S.No.	Place	Sb	Dbm	Lbm	Af	Yl	Y	Uc	Total	Ind. Ev.
1	Eetuyaathupodavu mottai	0	0	0	0	0	0	0	0	Yes
2	Chembuchi mottai	0	0	0	0	0	0	0	0	No
3	Pechi mottai	0	0	0	0	0	0	0	0	No
4	Tiruvannamalai mottai	4	3	2	0	0	2	2	13	
5	Muthukuzhi vayal	0	4	6	3	10	5	0	28	
6	Below the Valve house Winch point	0	1	4	1	9	1	4	20	
7	Varayadu mottai – Kodayar	4	0	5	0	0	4	10	23	
8	Agastiyar peak	0	0	0	0	0	0	0	0	No
9	Aaindutalanaaga podigi	0	0	0	0	0	0	0	0	No
10	Panchantangi Mottai	0	0	0	0	0	0	0	0	No
11	Nanduthu Mottai	0	0	0	0	0	0	0	0	No
12	Varayaadu mottai	0	0	0	0	0	0	0	0	No
	Total	8	8	17	4	19	12	16	84	

Note: Sb- Saddle back; Dbm-Dark brown male; Lbm-Light brown male; Af- Adult female; Yl-Yearling; Y- Young; UC-Unclassified; In. Ev.- Indirect evidence

APPENDIX II

COLLABORATIVE CENSUS WITH TAMIL NADU FOREST DEPARTMENT IN 3 DIVISIONS

Nilgiri tahr census, Mukurthi National Park & and the adjoining tahr areas – May 2011

S. No.	Area	N	Sb	Dbm	Lbm	Af	Yl	Y	Uc
1	Terrace Estate	Not done	0	0	0	0	0	0	0
2	Pandiar Top	Not done	0	0	0	0	0	0	0
3	Nilgiri Peak Base & Ella-malai	31	2	0	3	3	6	4	13
4	Devabetta	7	0	1	3	3	0	0	0
5	Mukurthi Peak	5	0	0	2	0	1	0	2
6	Chinna Mukurthi	48	6	6	6	15	10	4	1
7	Pichal Bettu & Pichakal Bettu	Not done	0	0	0	0	0	0	0
8	Watch tower – Western Catchment	66	1	2	1	26	5	13	18
9	Western Catchment III / Trekking shed	45	8	7	0	13	9	8	0
10	Western Catchment II	Not done	0	0	0	0	0	0	0
11	Kudiakadu Betta	5	1	0	0	0	0	0	4
12	Chattiparai / Kolaribetta	26	2	1	0	1	3	0	19
13	Western Catchment I	Not done	0	0	0	0	0	0	0
14	Madippumalai	0	0	0	0	0	0	0	0
15	Bangitapal - Ara Betta	5	0	0	1	1	0	0	3
16	Gulkal Malai & Nadukani east	44	0	2	2	13	7	6	14
17	Nadukani West	17	0	2	2	5	0	0	8
18	Nadukani Mattom	22	5	1	0	2	3	5	6
19	Sispara pass	6	0	0	1	3	1	1	0
20	Anguinda Malai	Not done	0	0	0	0	0	0	0
21	Tundukkal Malai & Bison swamp	0	0	0	0	0	0	0	0
22	East Varahapallam	7	1	0	0	1	2	3	0
23	West Varahapallam	9	1	0	0	1	0	4	3
24	Meekeri Betta / Kinnakorai	0	0	0	0	0	0	0	0
	Total	343	27	22	21	87	47	48	91

Note: N-Numbers observed; Sb- Saddle back; Dbm-Dark brown male; Lbm-Light brown male; Af- Adult female; Yl-Yearling; Y-Young; UC-Unclassified; In. ev– Indirect evidence

Nilgiri tahr census, Grizzled Giant Squirrel Wildlife Sanctuary, Srivilliputhur – June 2011

Showing the total count of Nilgiri tahrs with minimum projection in the surveyed 23 peaks with possibly classified population

S. No.	Range	Area	Sub total	N	Sb	Dbm	Lbm	Af	Yl	Y	Uc
1	Saptur	Thiruvakal - Kora-padi	75	32	5	1	0	6	6	7	7
2		Pudavukal		23	1	0	0	11	0	3	8
3		Perumalsamy Mottai		14	2	0	0	2	4	2	4
4		Naaraimoonji Mottai		6	1	2	0	0	1	2	0
5		Sulivarai / Vengaisil-ambu Mottai		0	0	0	0	0	0	0	0
6		Pechchi Mottai		0	0	0	0	0	0	0	0
7		Kottamalai		0	0	0	0	0	0	0	0
8	Watrap	Thanakkadi	33	6	1	0	0	4	0	1	0
9		Thaliaruthan Keni		15	0	0	1	3	1	4	6
10		Saralai Mottai		12	0	0	1	2	2	2	5
11		Aanai Mutti	15	4	0	0	0	0	0	0	4
12	Srivil-liputhur	Peimala Mottai (N)		0	0	0	0	0	0	0	0
13		Peimala Mottai (S)		3	3	0	0	0	0	0	0
14		Veilankal & Periya-puthu		1	0	0	0	1	0	0	0
15		Chembarali Mottai		2	2	0	0	0	0	0	0
16		Kuliratti		5	0	0	0	0	0	0	5
17	Rajapa-layam	Kunvengai Medu	27	0	0	0	0	0	0	0	0
18		Vellakaltheri medu		15	2	0	0	6	4	3	0
19		Kallakuli (Kambathu Mottai)		1	0	0	0	1	0	0	0
20		Varaiattu Mottai		0	0	0	0	0	0	0	0
21		Kothapanvarai		3	1	0	0	0	1	0	1
22		Mayandikadai Medu & Easwaran Thittu		6	0	0	0	0	0	0	6
23		Kuliratti Mottai (Rjpm)		2	0	0	0	1	0	0	1
		Total	150	150	18	3	2	37	19	24	47

Nilgiri tahr census, Grizzled Giant Squirrel Wildlife Sanctuary, Srivilliputhur – June 2011
Showing the total count of Nilgiri tahrs with minimum projection in the surveyed 23 peaks with possibly classified population

S. No.	Place	N	Sb	Dbm	Lbm	Af	Yl	Y	Uc
1	Meeshapuli & Manna Malai	91	1	0	0	66	11	12	1
2	Kolukkumalai	47	1	0	0	0	0	3	43
3	Tippida malai	0	0	0	0	0	0	0	0
4	Ibex cliff	5	1	0	0	2	2	0	0
5	Ibex peak	27	0	0	0	0	8	7	12
6	Attiuttu malai A	38	7	1	0	13	13	4	0
7	Attiuttu malai B	5	1	1	0	2	1	0	0
8	Unjal	5	1	0	0	2	2	0	0
9	Kunderi	3	1	0	2	0	0	0	0
10	Nagamalai	2	0	0	0	2	0	0	0
11	Marakkal malai	10	3	0	0	4	2	1	0
12	Vasakku malai	0	0	0	0	0	0	0	0
13	Chulagu malai	0	0	0	0	0	0	0	0
14	Total	233	16	2	2	91	39	27	56

Nilgiri tahr sightings on the different surveyed locations of the southeast zone with age & sex classification to the possible extent

S. No.	Range	Area	N	Sbm	Dbm	Lbm	Af	Yl	Y	Uc
1	Megamalai	Below the Aatumottai	32	7	0	0	0	0	0	25
2		left of Aatumottai	28	0	0	0	0	0	12	16
3		Varayatumottai	0	0	0	0	0	0	0	0
4		Padikattumottai	0	0	0	0	0	0	0	0
5		Bommarajapuram	13	0	2	2	5	3	1	0
6	Varushanad	Sallimuthan estate	9	0	0	0	0	0	0	9
7		Near Jothi estate	6	1	0	0	4	0	1	0
8	Gudalur	Mangaladevi hills (Vittathalli Mottai)	7	3	0	0	3	0	1	0
9		Mangaladevi hills (Varayatu Mottai)	3	2	0	0	0	0	1	0
	Total	98	13	2	2	12	3	16	50	

APPENDIX III

Reintroduction of Nilgiri tahr in two locations of the Western Ghats –

Dr. A.J.T.Johnsingh, WWF-India and Nature Conservation Foundation, Mysore

One of the findings from the surveys conducted in the Western Ghats by the Nature Conservation Foundation, Mysore, is the identification of locations for reintroduction of Nilgiri tahr. This survey was funded by the Ministry of Environment and Forests, Government of India; Save the Tiger Fund, National Fish and Wildlife Foundation, USA; Asian Big Cats Program, WWF-International (Switzerland) and the Rufford Small Grants Foundation (UK). This survey basically looked at corridors and landscapes for large animals.

Here, a suggestion was made for the reintroduction of tahr in the Glen Morgan mountain (located at 6,000 feet, Singara Range of Nilgiris North Forest Division) and in the upper reaches of Thirukurungudi Range (located at 4,000–5,500 feet, Kalakad-Mundanthurai Tiger Reserve). Both locations are capable of supporting 200 to 300 tahrs. The possible reasons for the extinction of tahr in Thirukurungudi Range are poaching, grazing, which may have led to competition for water in the summer and perhaps disease from livestock. The logbooks maintained by the Dhonavur Fellowship in Naraikadu (located at 3,000 feet, at the base of the tahr habitat) indicate the presence of tahrs in the nearby mountains (Kottangathatti, 5,017 feet and Kannunnie, 5,453 feet) till the 1960s. Dr. T. Sekar (2004, Forest History of the Nilgiris) reports the occurrence of tahrs on the cliffs of Sholur, Tharnad, Glen Morgan, Kodanad and Halli Moyar in the early 1900s. The reasons for the disappearance of tahrs in the Glen Morgan mountain may have been poaching and disease. Reintroduction of tahr in the Glen Morgan cliff should have the support and involvement of the inhabitants of Sholur village, which lies just to the west of the mountain.

Tahrs to be reintroduced in the Thirukurungudi Range must be brought from Grass Hills in the Anamalai Tiger Reserve. Tahr in Grass Hills can be habituated to the research team by providing salt, captured and transported by helicopter. The distance between Grass Hills and the tahr habitat in the Thirukurungudi Range is around 200 km, as the crow flies. Here, one should remember the remarkable study by Dr. Cliff Rice, who, within a period of eight months in Eravikulam NP, habituated 120 tahrs to his presence by providing salt. Eventually, he was able to equip 67 tahrs with colour-coded collars around the neck, merely by using a long stick. Tahrs for reintroduction in the Glen Morgan Cliff can be brought from Mukurthy NP where there is a tame group of tahrs and their translocation can be done by vehicles.

Tahr reintroduction in these two sites can be done as a collaborative effort by the National Tiger Conservation Authority, Tamil Nadu Forest Department, the Wildlife Institute of India, WWF-India and the Nature Conservation Foundation, Mysore. Funding can come from the Government of India.

WWF

STATUS AND DISTRIBUTION OF THE NILGIRI TAHR IN THE WESTERN GHATS, INDIA

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