

Prioritization of forests of Karur and Dindigul Forest Divisions for  
the conservation of the grey slender loris  
*Loris lydekkerianus lydekkerianus*



Sálim Ali Centre for Ornithology and  
Natural History



*Tamil Nadu Forest Department*

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SACON Technical Report – PR223

**Honnavalli N. Kumara<sup>1</sup>, Ramamoorthy Sasi<sup>1</sup>, Shantala Kumar<sup>2</sup> and  
Sanyukta Kasbekar<sup>1</sup>**

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<sup>1</sup>Sálim Ali Centre for Ornithology and Natural History, Anaikatty Post, Coimbatore, Tamil Nadu

<sup>2</sup>107 Riverstone Ruby Apartments, Vallalar Nagar, Vadavalli, Coimbatore, Tamil Nadu

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## Prioritisation of forests of Karur and Dindigul Forest Divisions for the conservation of the grey slender loris *Loris lydekkerianus lydekkerianus*

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### Introduction

One of the suborders of primates is Strepsirrhini that includes lemurs (in Madagascar), galagos and pottos (in Africa), and lorises (India and Southeast Asia). The lorises found in India are slow loris and grey slender loris, where slow loris is confined to forests of the northeast while grey slender loris is largely confined to South India. The grey slender loris found in India is named *Loris lydekkerianus* which also occurs in Sri Lanka (Groves 2001). In India, two subspecies of slender loris are recognized: Malabar Grey Slender Loris, *Loris lydekkerianus malabaricus*, found in the wet evergreen forests of the Western Ghats, and Mysore Grey Slender Loris, *L. l. lydekkerianus*, found in the relatively drier regions of southern India (Groves 2001; Kumara et al. 2013). The Mysore grey slender loris is greyish-brown in coat colour with narrow circumocular patches and an adult male and a female weighed 275 g each, whereas the Malabar grey slender loris is reddish with large circumocular patches and smaller in size, and a male and a female weighed 180 g each (Kumara et al. 2006). Nekaris (2001) reported the mean body weight of an adult Mysore grey slender loris to be 294.4 g and of females to be 259.7 g. Although, there is no molecular work to establish the relatedness of these two subspecies, but variation is recorded in the body mass and morphology.



Malabar grey slender loris



Mysore grey slender loris

The first-ever distribution map of the two subspecies of the slender loris was constructed using anecdotal records from the literature by Schulze and Meier (1995). The lorises being nocturnal,

they have to be surveyed at night, thus they were not surveyed or studied till 1996. The systematic survey for the first time was conducted in a few sites in Dindigul in 1996 (Singh et al. 1999), later in southern Andhra Pradesh (Singh et al. 2000), large areas of Karnataka (Kumara et al. 2006), Kerala (Radhakrishna et al. 2011; Sasi and Kumara 2014), Tamil Nadu (Kumara et al. 2016), and Aralam Wildlife Sanctuary (Gnanaolivu et al. 2020). The extent of the distribution of the Malabar slender loris is from the southern tip of the Western Ghats up to 15.8° N in Karnataka, the subspecies occurring primarily in the wet forests on the western slopes of the Ghats (Singh et al 2021). While the Mysore slender loris, occurring from the southern tip of India in Tamil Nadu, has been observed up to 14.2° N in the Nellore district of Andhra Pradesh, and it is found in dry deciduous and scrub forests (Singh et al 2021).

The density of Malabar slender loris is very thin in its entire distributional range (Kumara et al. 2006; Radhakrishna et al. 2011; Sasi and Kumara 2014), however, their distribution is contiguous as their habitat is contiguous along the Western Ghats. The vegetation type and altitude determined their occupancy and abundance. While, the habitat of Mysore slender loris is highly fragmented and very few, but found in high density in those fragments (Singh et al. 1999, 2000; Kumara et al. 2006; Sasi and Kumara 2014; Kumara et al. 2016). Although the Mysore slender loris is recorded from the agricultural fields, those fields are adjoining to these forest fragments. Their abundance is high in umbrella thorn forests and Euphorbia open forests, croplands close to the forests, mixed deciduous forests, while relatively less in the dense forest or open or highly degraded habitat between 300 and 500 m asl. They largely use the medium and low canopy having contiguity.

Of all the surveyed areas i.e., Kerala, Tamil Nadu, Karnataka, and Andhra Pradesh (Singh et al. 1999, 2000; Kumara et al. 2006; Sasi and Kumara 2014; Kumara et al. 2016), the major population of Mysore grey slender loris is found in few districts of Tamil Nadu i.e., Tiruchirapalli: 2.21/km; Pudukottai: 1.95/km; Sivaganga: 1.41/km; Karur: 1.23/km; Dindugal: 1.1/km (Singh et al. 1999; Kumara et al. 2016). However, this information is from a one-time survey in select sites, nevertheless, that provides preliminary information on their abundance. The robust estimates of the population always come from the proper design of the study and effort. To demonstrate this, lorises were estimated using the line-transect technique following the principles of DISTANCE theory in 2005-07 by Kumara and Radhakrishna (2013) in the Dindigul district. Later using the same technique, forest patches were prioritized for conservation in Karnataka (Das et al. 2011). This indicates that many of these techniques can

be used to ascertain their population size. Kumara and Radhakrishna (2013) reported no difference in the estimate of density from the data collected at different timings of the night or moon phases. This demonstrated that the survey can be conducted at any time of the night.

Most of the Mysore slender loris range falls outside the protected area network, and their high-density patches are highly vulnerable due to many of the developmental activities and anthropogenic pressure. Although lorises are found outside the forest patches in agriculture fields, they are the dispersed animals from the source population that is found in the forest areas, thus, perhaps conserving such source populations is crucial. In order to achieve this goal, the systematic survey of Mysore grey slender loris was conducted in select reserve forests of Karur and the Dindigul districts of Tamil Nadu. The findings of the survey of slender loris are reported here.

## Methodology

**Survey sites:** A total of 15 reserved forests were selected to conduct the survey of slender loris in the Karur and Dindigul districts (Figure 1). Considering the area and access three reserved forests of Mullipadi are considered as one Mullipadi Reserved Forest, thus the number of sampled reserved forests is projected as 13 (Table 1).

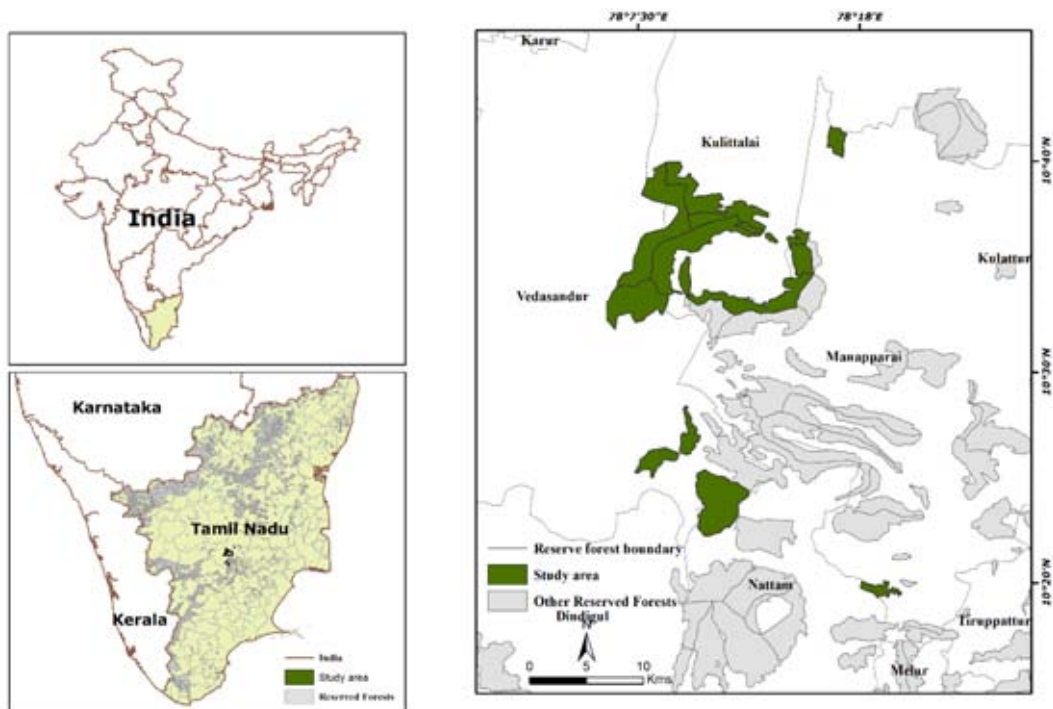


Figure 1. The select reserved forest to survey the slender loris in Karur and Dindigul districts.

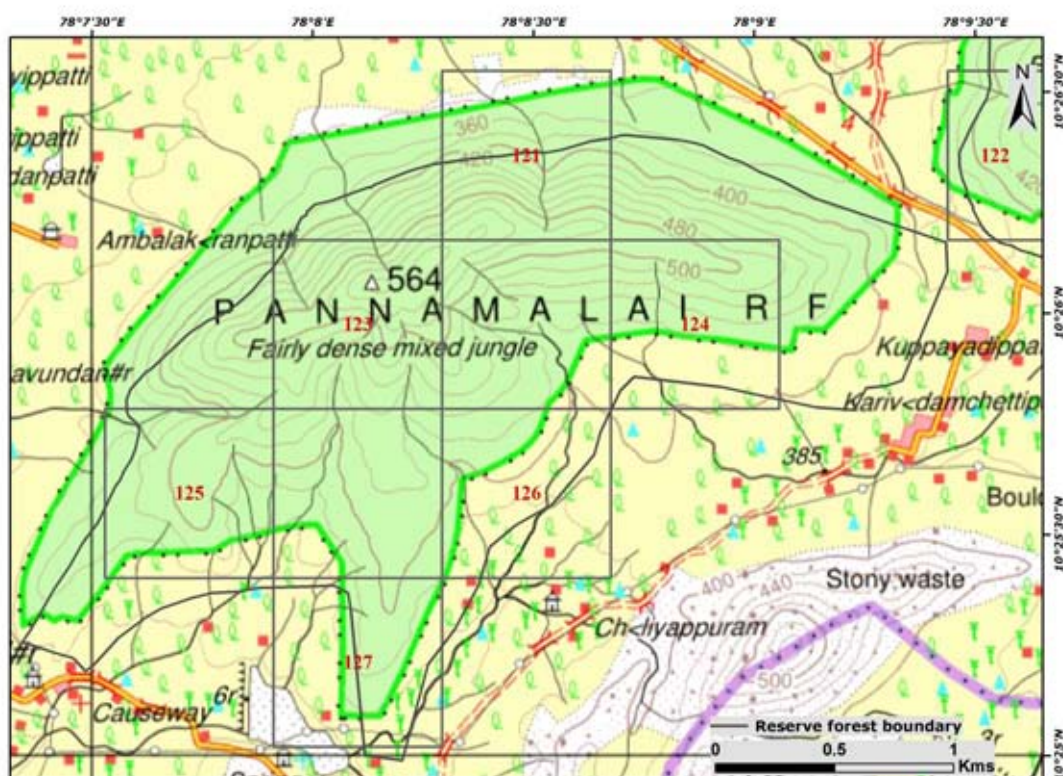
Table 1. The select reserved forests in Karur and Dindigul districts to conduct a survey of slender loris

Sl. No.	Name of Division	Name of RF	Extent in Ha
1	Dindigul	Pannamalai RF	468.78
2	Dindigul	Thanneerkaradu RF	389.79
3	Dindigul	Chinnayampatti RF	252.93
4	Dindigul	Thoppasamimalai RF	3453.01
5	Dindigul	Mudimalai	1794.80
6	Karur	D. Edayapatty- Bit-I RF	1784.94
7	Karur	D. Edayapatty- Bit-II RF	402.85
8	Karur	D. Edayapatty- Bit-III RF	1255.12
9	Karur	D. Edayapatty- Bit-IV RF	243.21
10	Karur	Mullipadi RF	301.89
11	Karur	Palaviduthi RF	750.37
12	Karur	Sembianatham RF	961.80
13	Karur	Vaiyamalaipalayam RF	278.91

The area, physical features, forest type, and major flora for each reserved forest are provided in detail.



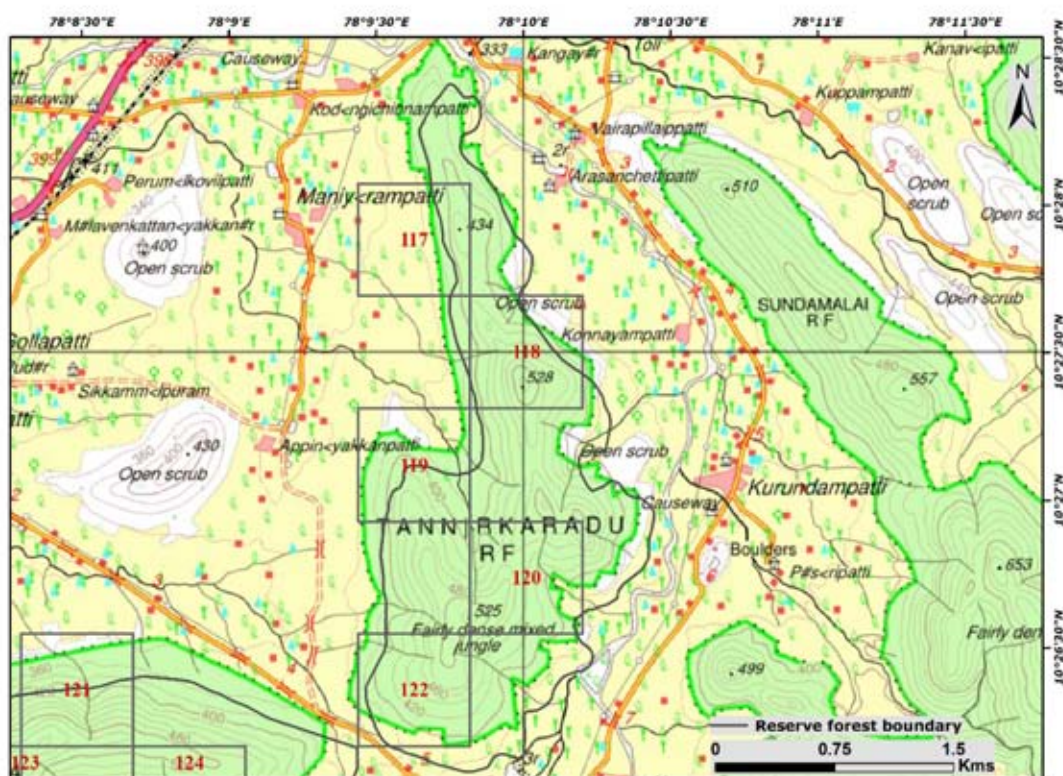
## Pannamalai RF



Division	Dindigul
Range	Ayyalur
Section	Senthurai
Beat	Ayyalur
Location	
Reserved Forest Formed in G.O.No.	169 dt. 29.3.1893
Area in Ha.	468.77
Enclosure Villages or hamlet	Nearby villages Ambalakaranpatti Kupadipatti
Altitudinal Range	200 – 564 Meters MSL
Details of existing roads	Path from Vadamadurai to Puthur is nearby
Forest type	6A/C2/DS 2 - Southern Euphorbia Scrub forest
Major Flora	<i>Acacia planifrons</i> , <i>Tamarindus indica</i> , <i>Albizia asnara</i> , <i>Wrightia tinctoria</i> , <i>Acacia fermgnia</i> , <i>Adina cardifolia</i> , <i>A/adirachta indica</i> , <i>Acacia leucophloea</i>
Non - Timber Forest Produce is available	Sundakai, Neem fruits, Usil leaves, Eachamar
Rainfall	900 mm P
Soil Type	Red gravelly and laterite soil

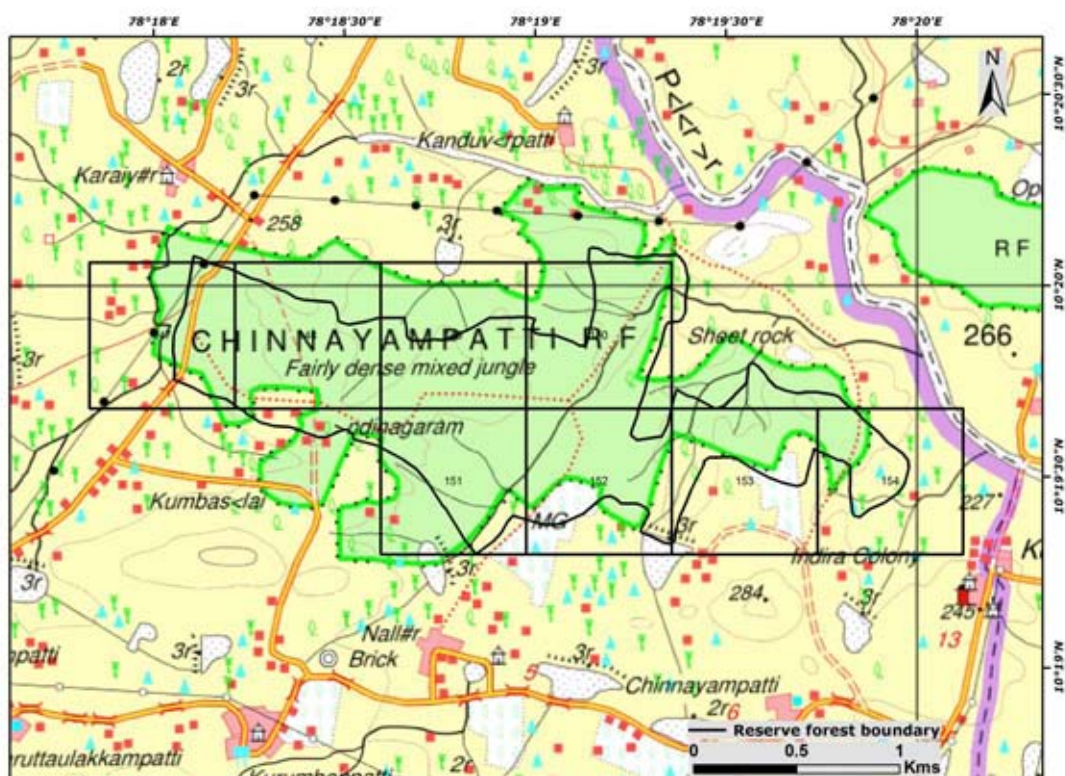


## Thanneerkaradu RF



Division	Dindigul
Range	Ayyalur
Section	Senthurai
Beat	Ayyalur
Location	
Reserved Forest Formed in G.O.No.	101 dt 19.3.86
Area in Ha.	389.62 Ha..
Enclosure Villages or hamlet	Nearby villages kurudampatti, Ayyalur in the North and Kupadipati in the south
Altitudinal Range	200 – 528 Meters MSL
Details of existing roads	A path from Maniakaranpatti passes through (to
Forest type	6A/C2 - Southern Umbrella Thorn forest
Major Flora	<i>Acacia planifrons</i> , <i>Albizia amara</i> , <i>Acacia leucophioea</i> , <i>Adina cardifolia</i> , <i>Tamarindus indica</i> , <i>Wrightia tincioria</i> , <i>Cassia auriculata</i> , <i>Balsamodendron herrii</i>
Non-Timber Forest Produce is available	Sundakai, Neem fruits, Usil leaves, Eachamar
Rainfall	900 mm P
Soil Type	Red gravelly soil- 75%, Sandy loam-15% others-10%

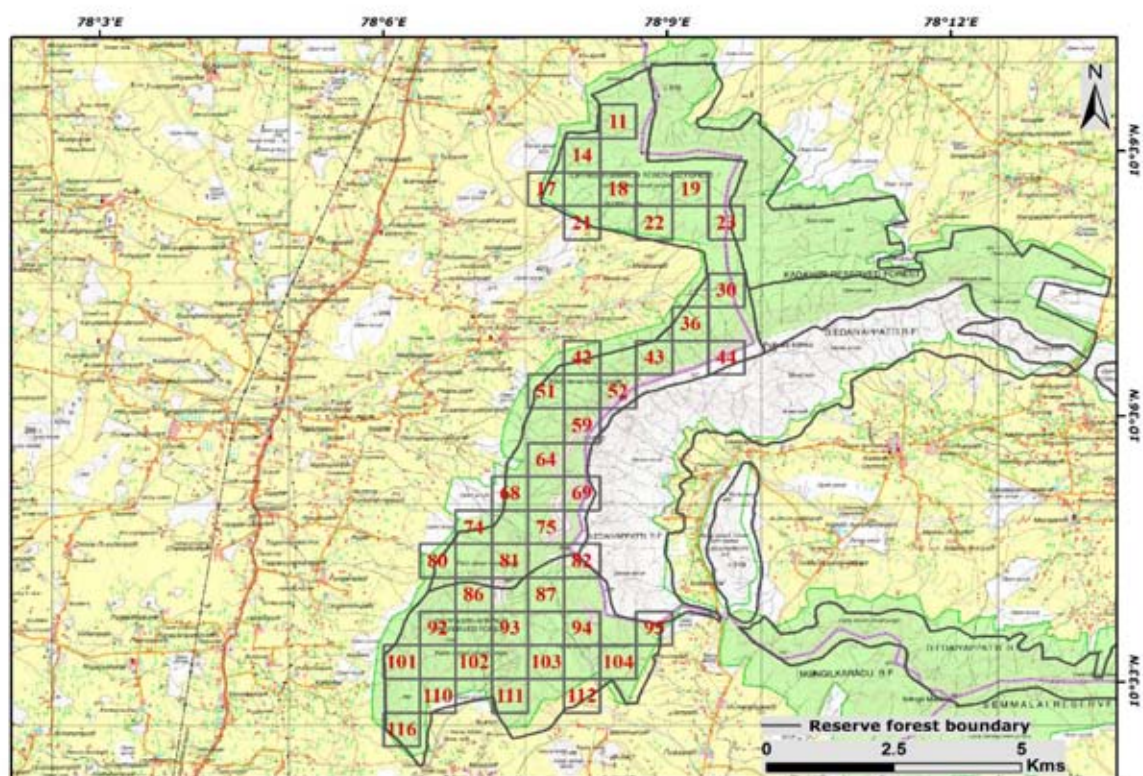
## Chinnayampatti RF



Division	Dindigul
Range	Natham Range
Section	Natham
Beat	Kuttupatty
Reserved Forest Formed in G.O.No.	144 dt. 11.3.1943
Area in Ha.	252.46 Ha.
Enclosure Villages or hamlet	Nearby villages Chinnayampatti Kosukurichi
Details of structure available	Chittambakoil
Details of existing roads	Road to Thuvrankurichi from Natham
Details of a live wire passing through Reserved Forest	E.B. wire passes through R.F.
Forest type	6A/C2 -Southern Umbrella Thorn forest
Checklist of Flora	<i>Albizia amara</i> , <i>Chloroxylon swietenia</i> , <i>Wrightia tinctoria</i> , <i>Acacia leucophloea</i> , <i>Albizia lebbek</i>
Non - Timber Forest Produce is available	Tamarind, Sundakai
Soil Type	Red gravelly soil 30%, Laterite 30%, Sandy loam 20%, Black cotton soil 20%

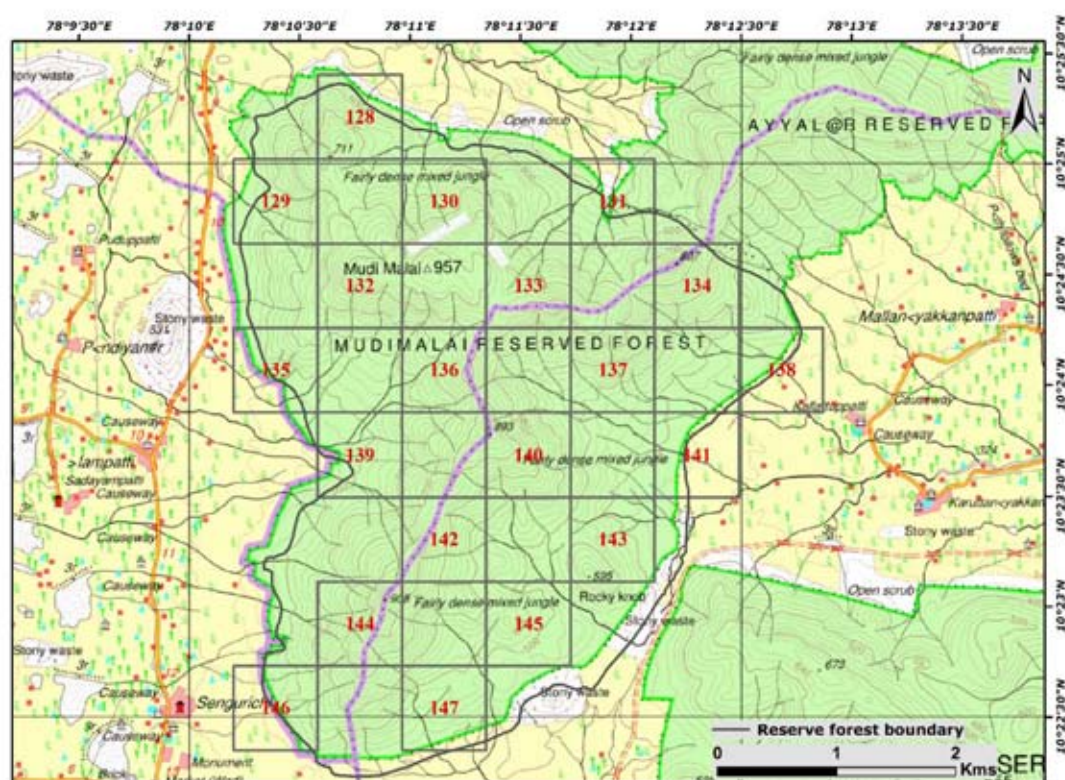


## Thoppasamymalai RF



Division	Dindigul
Range	Ayyalur
Section	Ehodu
Beat	Malaipatty Beat and R.Combai beat
Reserved Forest Formed in G.O.No.	453 dt. 18.11.1901
Area in Ha.	3452.98 Ho..
WATERSHED AREA	Kodavanar River
Enclosure Villages or hamlet	Nearby village kombai
Details of structure available	Mumapankoil near the banks of the stream varatar, Bomayasamikoil, Kannimarkoil, and
Details of existing roads	A path from the Kombai to Virarmullai passes through R.F.
Forest type	6A/C2/DS2 - Southern Euphorbia Scrub Forest 6A/C2 - Southern Umbrella Thorn forest
Checklist of Flora	<i>Albizia amara</i> , <i>Thaaku</i> , <i>Neem</i> , <i>Veppalai</i> , <i>Nelli</i> , <i>Sundakai</i> , <i>Tamarind</i> , <i>Vagal</i> .
Non - Timber Forest Produce is available	Sundakai, Bodhaigrass, Eachamar
Soil Type	Red Soil 5% Laterite soil - 30% other -65%

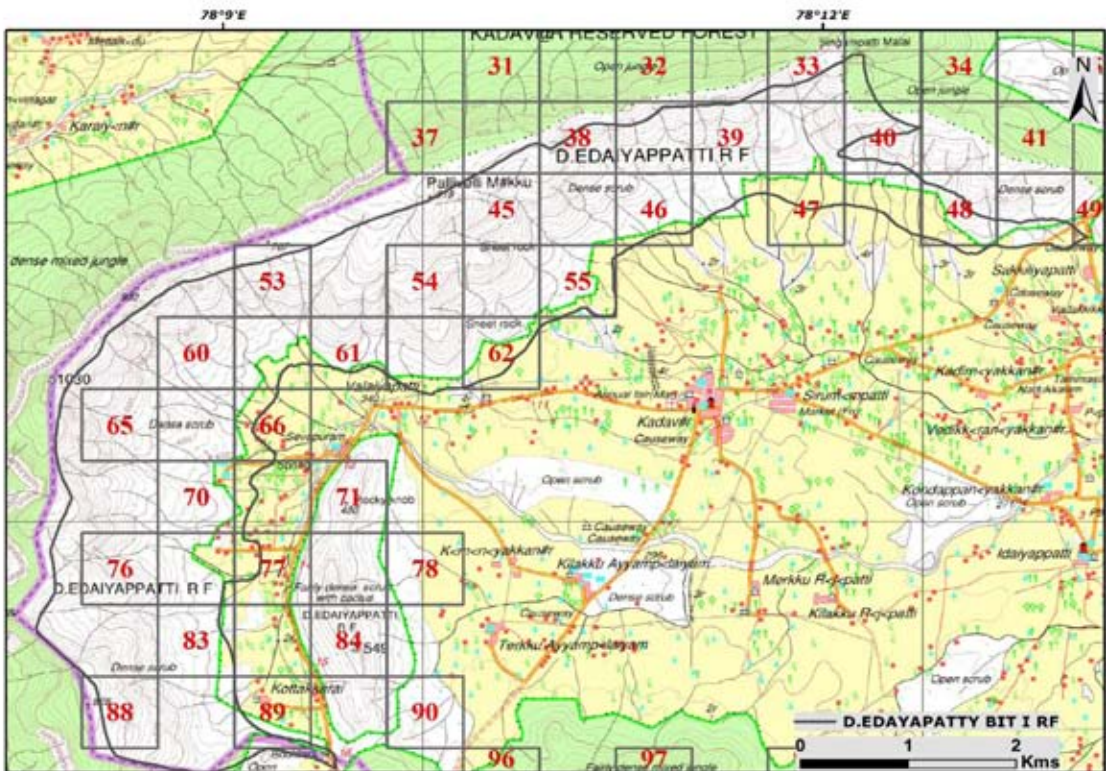
## Mudimalai RF



Division	Dindigul
Range	Ayyalur
Section	Senthurai
Beat	Puthur
Location	
Reserved Forest Formed in G.O.No.	187 dt. 11.10.83
Area in Ha.	1794.80 Ha
Enclosure Villages or hamlet	Senkurichi, nearby village,
Altitudinal Range	200 – 957Meters MSL
Details of existing roads	A path from Senkurichi along the boundary
Forest type	6 A/C2 – Southern Umbrella Thorn Forest
Major Flora	<i>Acacia planifrons</i> , <i>Albizia amara</i> , <i>Tamarindus indica</i> , <i>Adina cardifolia</i> , <i>Acacia ferrugioea</i> , <i>Cassia auriculata</i>
Non - Timber Forest Produce is available	Sundakai, Tamarind, Usil leaves
Rainfall	900 mm P
Soil Type	Red gravelly soil - 40%, Laterite - 20%, Others 40%

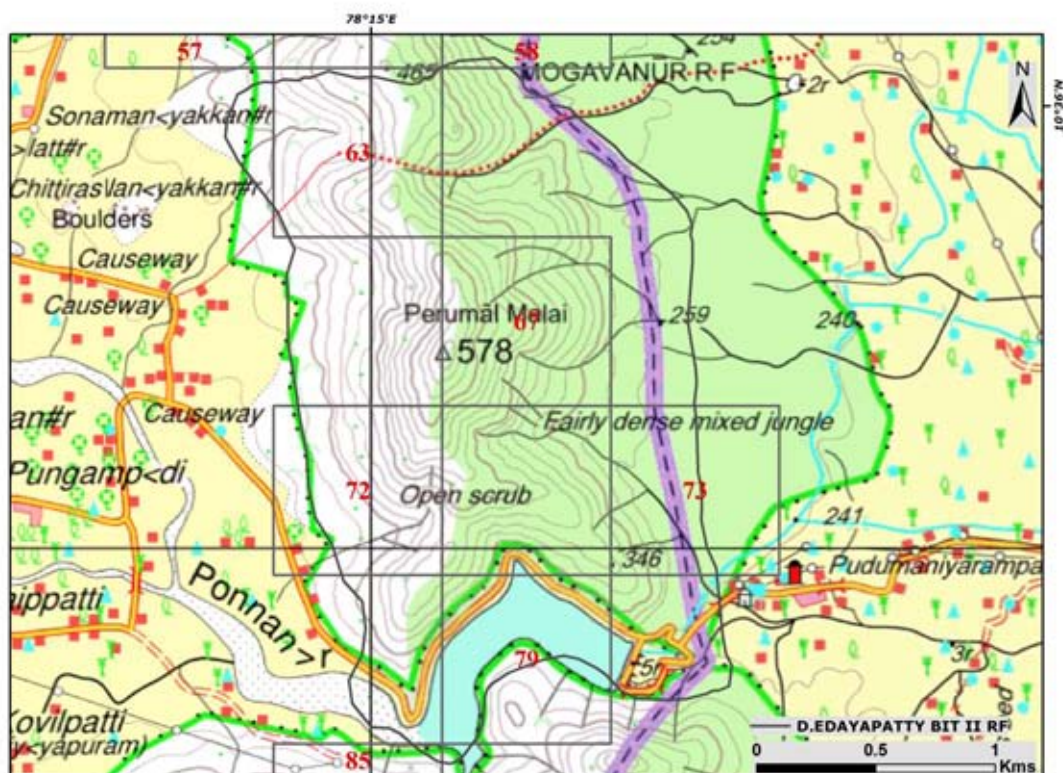


### **D.Edayapatty-Bit-1 RF**



Division	Karur
Range	Karur
Section	Kadavur
Beat	D.Edayapatti west
Location	
Reserved Forest Formed in G.O.No.	No.92 EandF dt.26.04.2000
Area in Ha.	1784.94Ha
Enclosure Villages or hamlet	Kadavur nearby village,
Altitudinal Range	200 – 1030 Meters MSL
Details of existing roads	Kadavur- Ayyalur and Kadavur -Mailampatty
Forest type	6 A/C2 – Southern Umbrella Thorn Forest 6A/C2/DS2 - Southern EuphorbiaScrub Forest
Major Flora	<i>Acacia planifrons</i> , <i>Albizia amara</i> , <i>Tamarindus indica</i> , <i>Adina cardifolia</i> , <i>Acacia ferrugioea</i> , <i>Cassia auriculata</i>
Non - Timber Forest Produce is available	Sundakai, Tamarind, Usil leaves
Rainfall	900 mm P
Soil Type	Red gravelly soil - 40%, Laterite - 20%, Others 40%

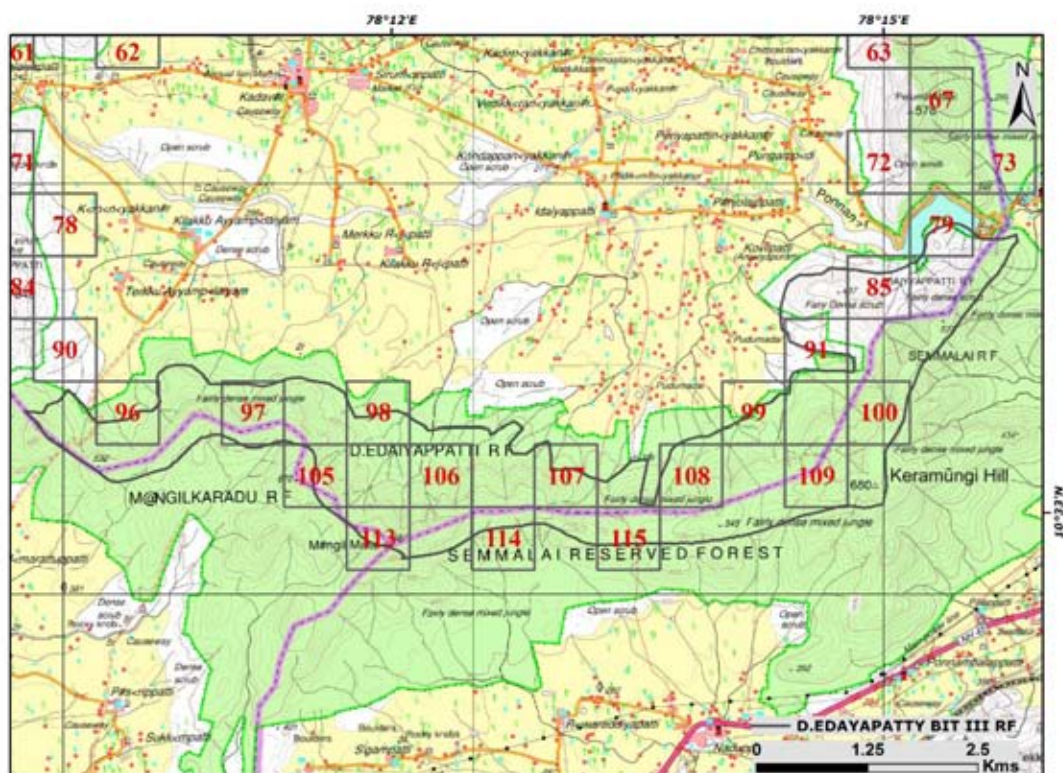
## D.Edayapatty-Bit-2 RF



Division	Karur
Range	Karur
Section	Kadavur
Beat	D.Edayapatti East
Location	
Reserved Forest Formed in G.O.No.	No.297 E and F dt. 01.11.04
Area in Ha.	402.85Ha
Enclosure Villages or hamlet	Kadavur nearby village,
Altitudinal Range	240 – 578 Meters MSL
Details of existing roads	Kadavur- Pudumaniyarampatti-Karungulam road passes alongside
Forest type	6 A/C2 – Southern Umbrella Thorn Forest 6A/C2/DS2 - Southern EuphorbiaScrub Forest
Major Flora	<i>Acacia planifrons</i> , <i>Albizia amara</i> , <i>Tamarindus indica</i> , <i>Adina cardifolia</i> , <i>Acacia ferrugioea</i> , <i>Cassia auriculata</i>
Non - Timber Forest Produce is available	Sundakai, Tamarind, Usil leaves
Rainfall	900 mm P
Soil Type	Red gravelly soil and Laterite

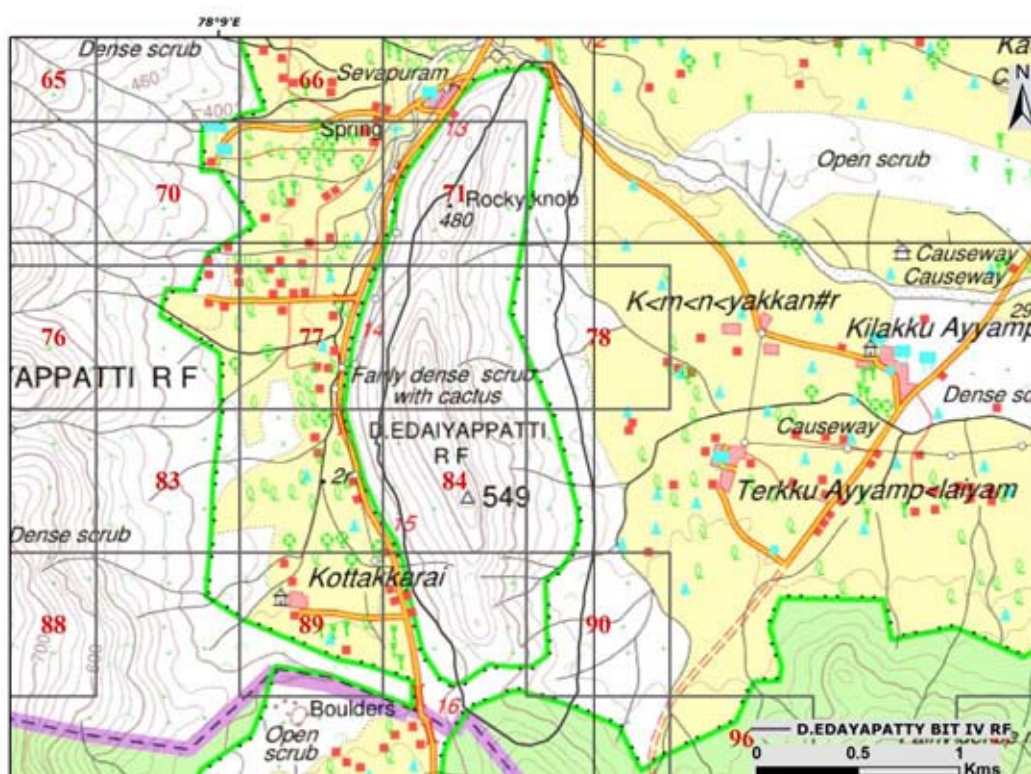


### D.Edayapatty-Bit-3 RF



Division	Karur
Range	Karur
Section	Kadavur
Beat	D.Edayapatti East
Location	
Reserved Forest Formed in G.O.No.	No.80 E and F(FR-XIV) dt. 26.02.2004
Area in Ha.	1255.12Ha
Enclosure Villages or hamlet	Kadavur nearby village,
Altitudinal Range	240 – 578 Meters MSL
Details of existing roads	Kadavur- Pudumaniyarampatti-Karungulam road passes alongside
Forest type	6 A/C2 – Southern Umbrella Thorn Forest 6A/C2/DS2 - Southern EuphorbiaScrub Forest
Major Flora	<i>Acacia planifrons</i> , <i>Albizia amara</i> , <i>Tamarindus indica</i> , <i>Adina cardifolia</i> , <i>Acacia ferrugioea</i> , <i>Cassia auriculata</i>
Non - Timber Forest Produce is available	Sundakai, Tamarind, Usil leaves
Rainfall	900 mm P
Soil Type	Red gravelly soil and Laterite

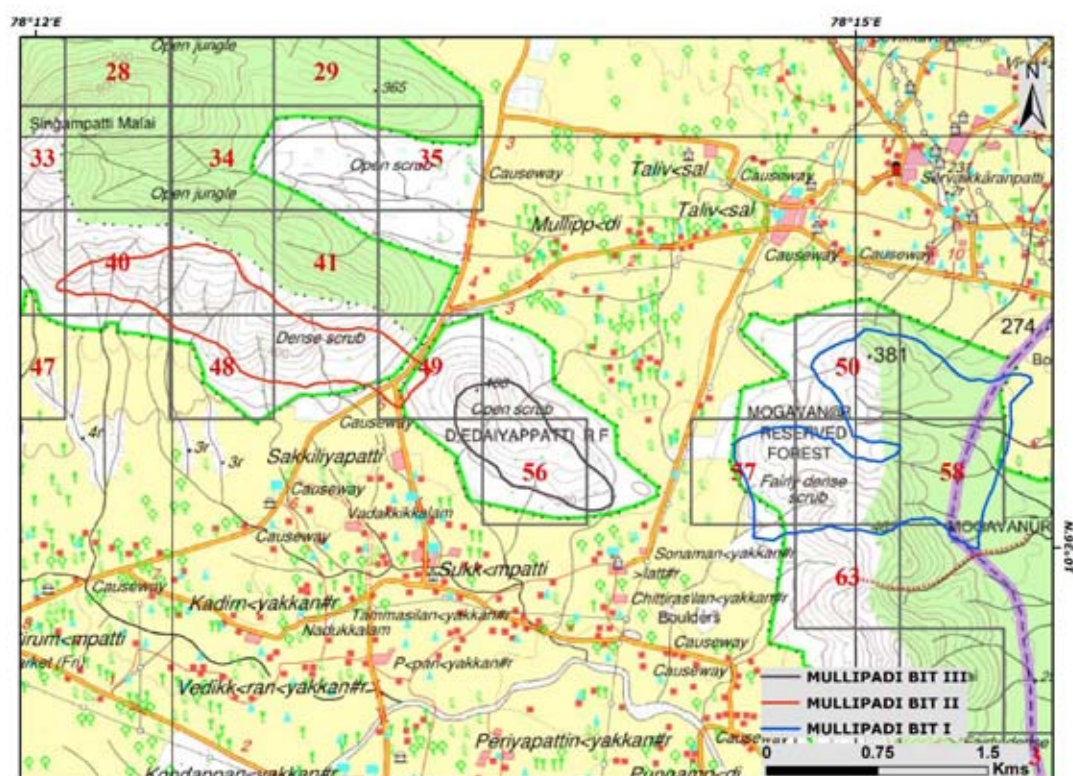
### D.Edayapatty-Bit-4 RF



Division	Karur
Range	Karur
Section	Kadavur
Beat	D.Edayapatti west
Location	
Reserved Forest Formed in G.O.No.	No.281 EandF (FR-XIV) dt.22.09.1998
Area in Ha.	243.21Ha
Enclosure Villages or hamlet	Kadavur nearby village,
Altitudinal Range	200 – 549 Meters MSL
Details of existing roads	Kadavur- Ayyalur road alongside
Forest type	6A/C2/DS2 - Southern EuphorbiaScrub Forest 6 A/C2 – Southern Umbrella Thorn Forest
Major Flora	<i>Acacia planifrons</i> , <i>Albizia amara</i> , <i>Tamarindus indica</i> , <i>Adina cardifolia</i> , <i>Acacia ferrugioea</i> , <i>Cassia auriculata</i>
Non - Timber Forest Produce is available	Sundakai, Tamarind, Usil leaves
Rainfall	900 mm P
Soil Type	Red gravelly soil and Laterite

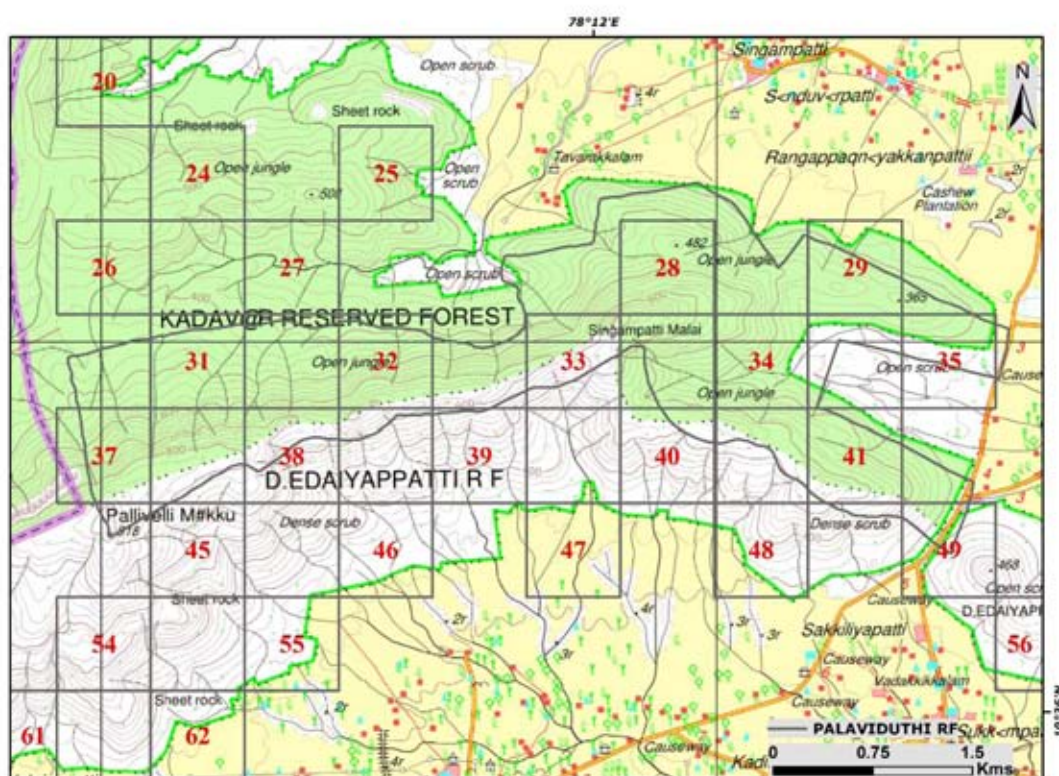


## Mullipadi-Bit-1,2and3 RF



Division	Karur
Range	Karur
Section	Kadavur
Beat	Palaviduthi, Palaviduthi and D.Edayapatti west
Location	
Reserved Forest Formed in G.O.No.	No.842 FandF dt.21.06.1978, No.872 FandF dt. 05.10.1978 and No.839 FandF dt. 26.09.1998.
Area in Ha.	138.74Ha, 117.06Ha and 46.09Ha
Enclosure Villages or hamlet	Kadavur nearby village,
Altitudinal Range	200 – 465 Meters MSL
Details of existing roads	Kadavur- Palaviduthi road alongside
Forest type	6A/C2/DS2 - Southern EuphorbiaScrub Forest 6 A/C2 – Southern Umbrella Thorn Forest
Major Flora	<i>Acacia planifrons</i> , <i>Albizia amara</i> , <i>Tamarindus indica</i> , <i>Adina cardifolia</i> , <i>Acacia ferrugioea</i> , <i>Cassia auriculata</i>
Non - Timber Forest Produce is available	Sundakai, Tamarind, Usil leaves
Rainfall	900 mm P
Soil Type	Red gravelly soil and Laterite

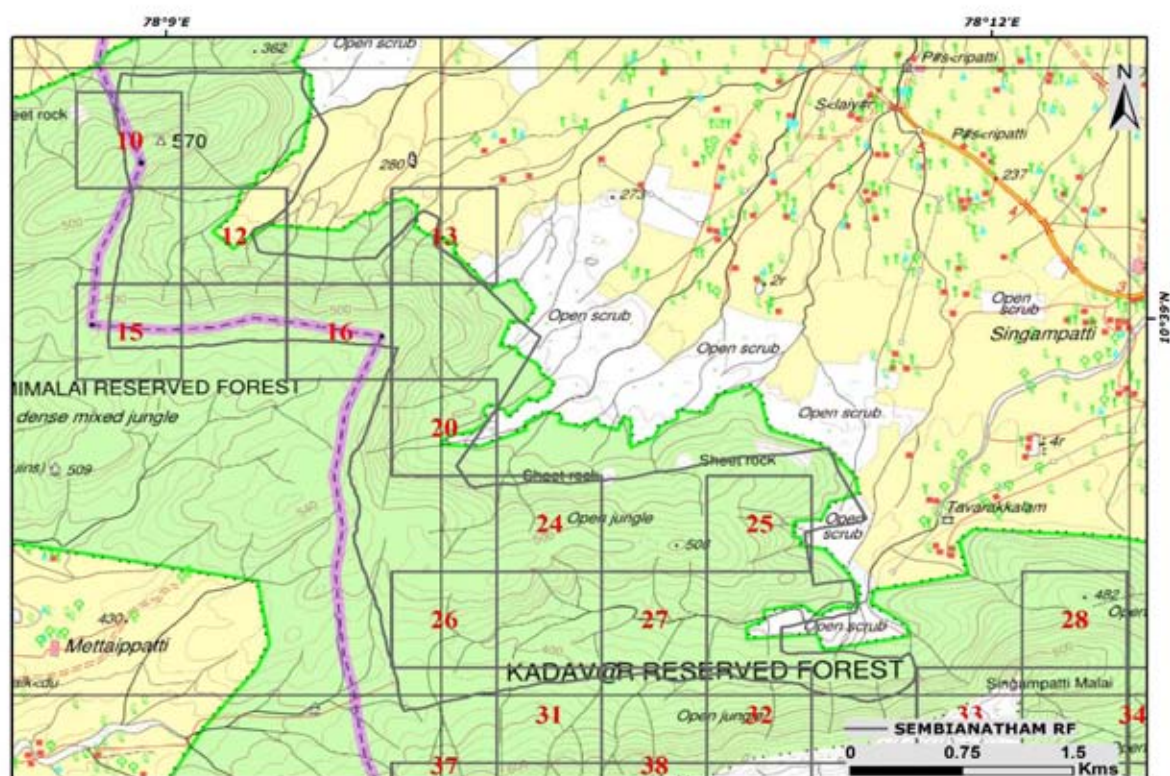
## Palaviduthi RF



Division	Karur
Range	Karur
Section	Kadavur
Beat	Palaviduthi
Location	
Reserved Forest Formed in G.O.No.	No.461 FandF dt. 16.05.1979
Area in Ha.	750.37Ha
Enclosure Villages or hamlet	Kadavur nearby village,
Altitudinal Range	200 – 800 Meters MSL
Details of existing roads	Kadavur- Palaviduthi road alongside
Forest type	6 A/C2 – Southern Umbrella Thorn Forest
Major Flora	<i>Acacia planifrons</i> , <i>Albizia amara</i> , <i>Tamarindus indica</i> , <i>Adina cardifolia</i> , <i>Acacia ferrugioea</i> , <i>Cassia auriculata</i>
Non - Timber Forest Produce is available	Sundakai, Tamarind, Usil leaves
Rainfall	900 mm P
Soil Type	Red gravelly soil and Laterite

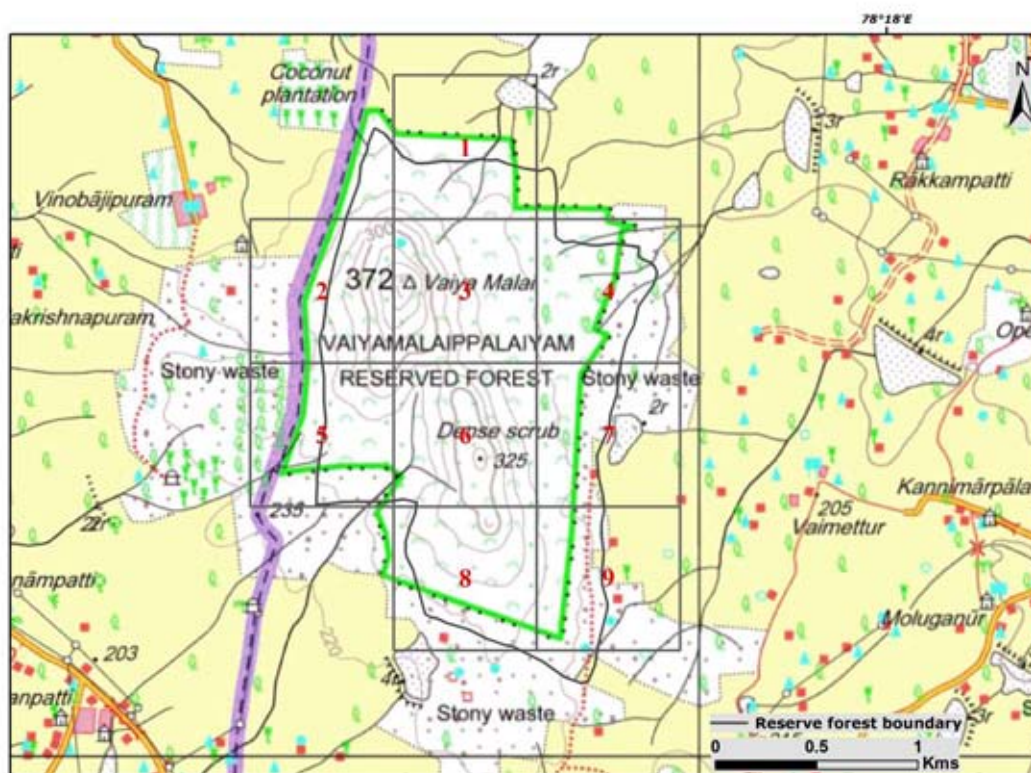


## Sembiyanatham RF



Division	Karur
Range	Karur
Section	Kadavur
Beat	Singampatti
Location	
Reserved Forest Formed in G.O.No.	No.474 FandF dt. 18.05.1979
Area in Ha.	961.80Ha
Enclosure Villages or hamlet	Sembiyanatham
Altitudinal Range	200 – 570Meters MSL
Details of existing roads	NIL
Forest type	6 A/C2 – Southern Umbrella Thorn Forest
Major Flora	<i>Acacia planifrons</i> , <i>Albizia amara</i> , <i>Tamarindus indica</i> , <i>Adina cardifolia</i> , <i>Acacia ferrugioea</i> , <i>Cassia auriculata</i>
Non - Timber Forest Produce is available	Sundakai, Tamarind, Usil leaves
Rainfall	900 mm P
Soil Type	Red gravelly soil and Laterite

## Vaiyamalaipalayam RF



Division	Karur
Range	Karur
Section	Kadavur
Beat	Singampatti
Location	
Reserved Forest Formed in G.O.No.	No.3047 dt. 21.09.1966
Area in Ha.	278.91Ha
Enclosure Villages or hamlet	Vaiyamalaipalayam
Altitudinal Range	200 – 372Meters MSL
Details of existing roads	NIL
Forest type	6A/C2/DS2 - Southern EuphorbiaScrub Forest
Major Flora	<i>Acacia planifrons</i> , <i>Albizia amara</i> , <i>Tamarindus indica</i> , <i>Adina cardifolia</i> , <i>Acacia ferrugioea</i> , <i>Cassia auriculata</i>
Non - Timber Forest Produce is available	Sundakai, Tamarind, Usil leaves
Rainfall	900 mm P
Soil Type	Red gravelly soil and Laterite



**Methods:** We overlaid 0.5 km<sup>2</sup> grid cells on the map of the select reserved forests to distribute the transects to cover spatially the entire reserved forests (Figure 2). All the 155 grid cells were numbered and used those numbers for the assessment. We identified a set of grid cells (n =33) to sample for the lorises as one sampling unit for the one team.

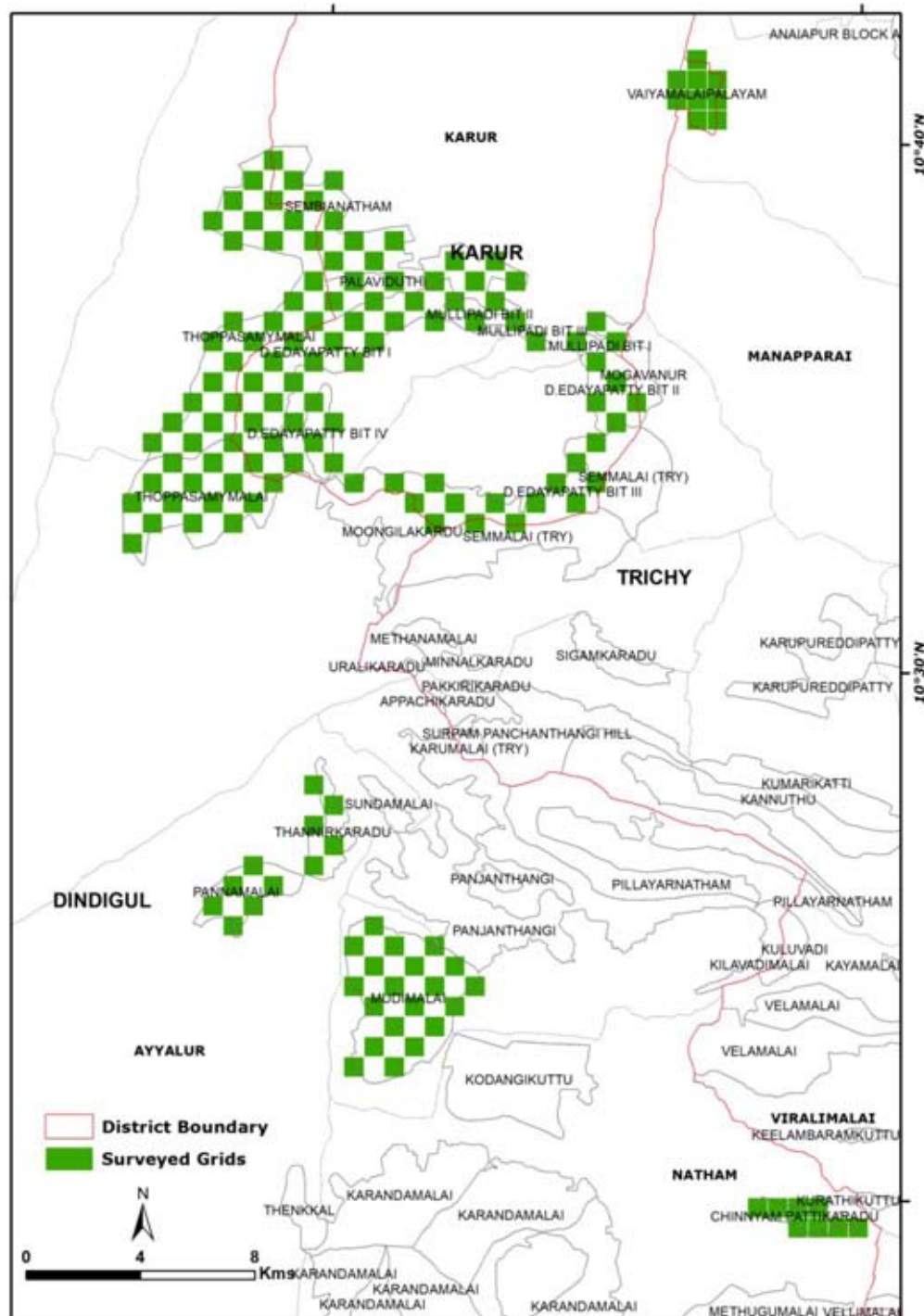
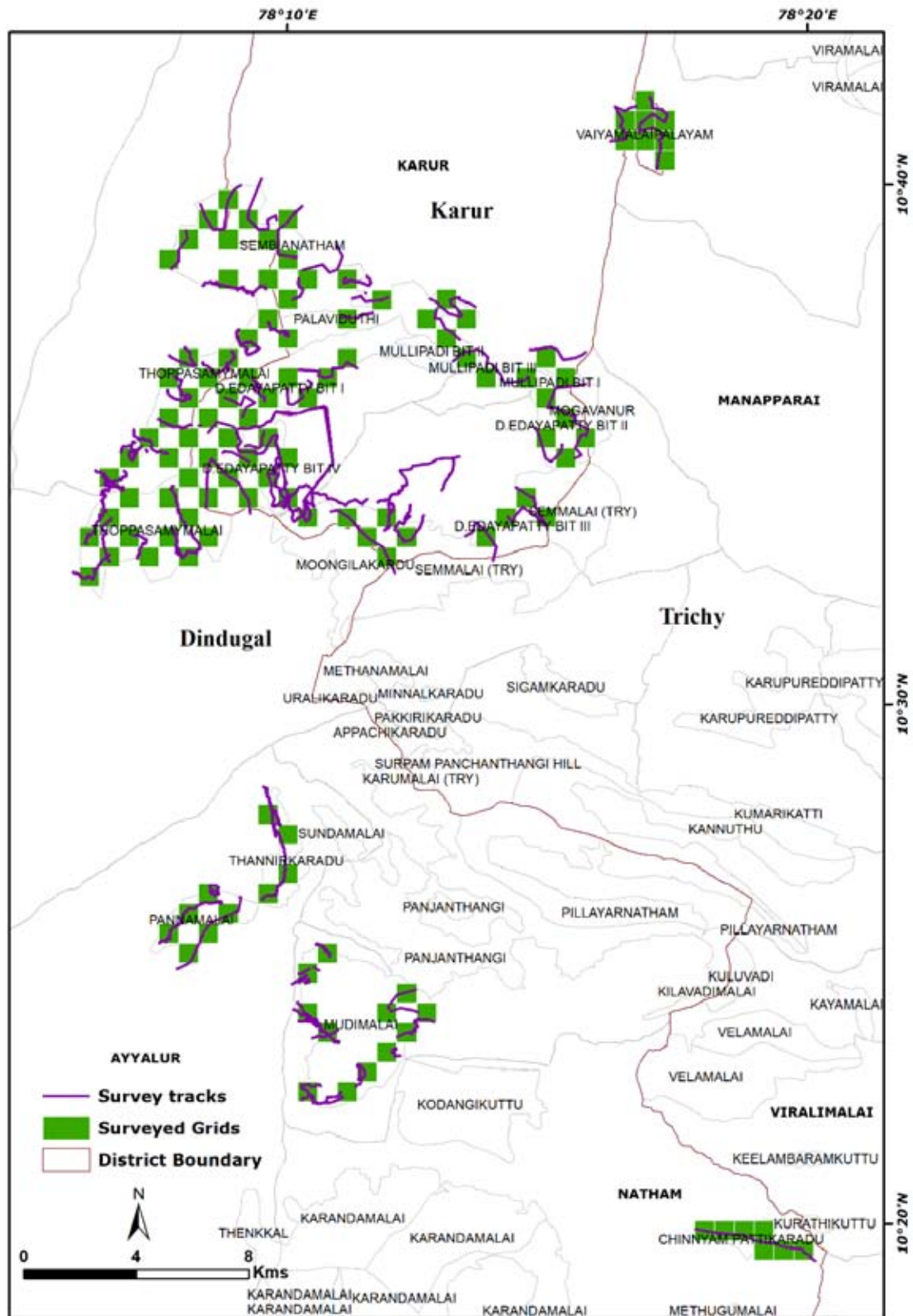


Figure 2. Sampling grids in the Karur and Dindigul districts



We trained the department personnel and also wildlife enthusiasts to use the handheld GPS, light, range finder, and compass. They were further trained to walk on the fixed transect line,

locating of the line using the handheld GPS, spot the loris at night, recording of the parameters. After the training, we formed 33 teams consisting of one department personnel and one trained wildlife enthusiast. They walked the transect between 1900 hours and 0100 hours to collect the data. Each transect was replicated four times. The assessment was done from 24<sup>th</sup> to 27<sup>th</sup> February 2022.

During the walk, once the loris is sighted, geocoordinate of the location using GPS, a number of individuals, animal to observer distance using range finder, angle of the animal to the transect line, height of the animal and height of the tree, activity of the loris when it was sighted and elevation of the located site was recorded in the datasheet. Using the GPS, the transect of the walk made was recorded (Figure 3).

### **Analysis**

Using the track recorded in the GPS in the suggested grid cells was downloaded and measured the distance walked and recorded. For each replication of the transect number of lorises sighted is computed from the datasheet. Using this, the number of lorises sighted per kilometer was computed. Using the encounter rate of each replication, the mean encounter rate and associated standard deviation were computed. The encounter rate is projected as an index of abundance in the current report. Using the computed encounter rate, the density was predicted for each reserved forest by developing the regression equation of known density and encounter rate of lorises across the studies.

The density estimates are available from six sites, where the line transects were established and systematically walked. Using the data from the transect, the estimate of loris was computed in the DISTANCE application. From those studies, the estimate of density and corresponding encounter rate of lorises were obtained and correlated the same to check the relationship (nonparametric - spearman). Although the relationship is not highly significant but it is significant at 0.05 level ( $r_s = 0.829$ ,  $N = 6$ ,  $p < .05$ ) (Figure 4). Thus, we regressed the relationship and came out with the regression line and equation ( $Y = -0.353 + 0.487$  (encounter rate)). Using the calculated encounter rate of lorises from the survey in the regression equation, we predicted the lorises per hectare. We presumed that the entire reserved forest is having a suitable habitat for the lorises, the predicted loris density was multiplied by the area of the reserved forests.

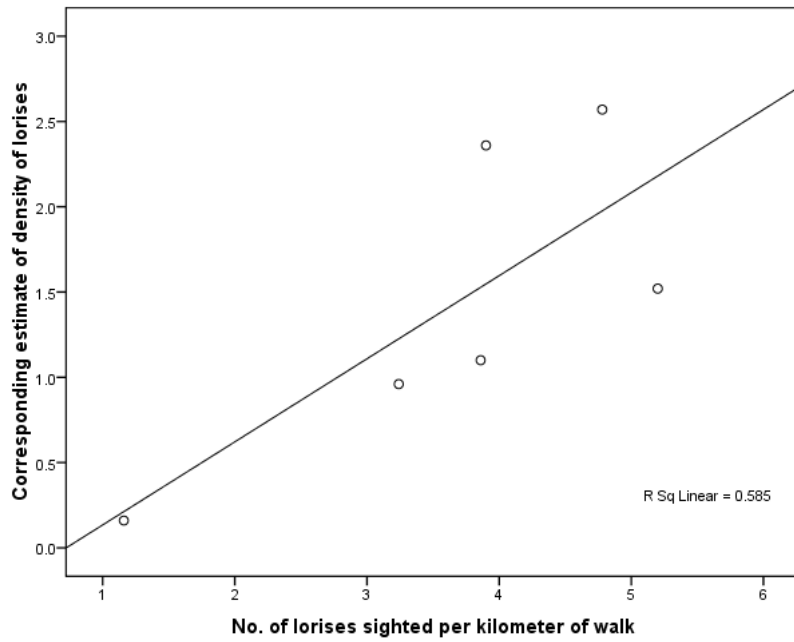


Figure 4. Relationship between encounter rate of lorises and the corresponding estimate of density in different studies (Kumara and Radhakrishna 2013; Das et al. 2011).

We also mapped all the detections on the map of reserved forests to visualize the locations of slender loris sightings.

## Results

A total of 155 grid cells were planned to sample for the slender lorises, however, due to various terrain and logistical issues, 123 grid cells were sampled in the select reserved forests of Karur and Dindigul districts. Of the 123 grid cells sampled, lorises were recorded in 100 grid cells that account for about 81 % of the sampled area had lorises (Figure 5).

A total of 374.11 km of transect walk was made in 13 reserved forests (Table 2). The number of transects and the kilometer walked was proportional to the area of the reserved forests. During this walk, a total of 1176 lorises were recorded (Table 2, Figure 6), which provided the encounter rate of 3.14 lorises per km walked.

The encounter rate of lorises varied from the lowest of 1.77 to the highest of 6.22 lorises per km walked (Table 3). Chinnayampatti RF and Pannamalai RF in the Dindigul district had the encounter rate of 6.22 and  $5.83 \pm 3.72$  lorises per km respectively, which was followed by

Mullipadi RF and Vaiyamalaipalayam RF of Karur district with the encounter rate of 4.21 and 4.04 lorises per km respectively. Lorises were recorded between 200 and 600 m of elevation, where more than 70% of them were in the elevation gradient between 200 and 400 m (Figure 7).

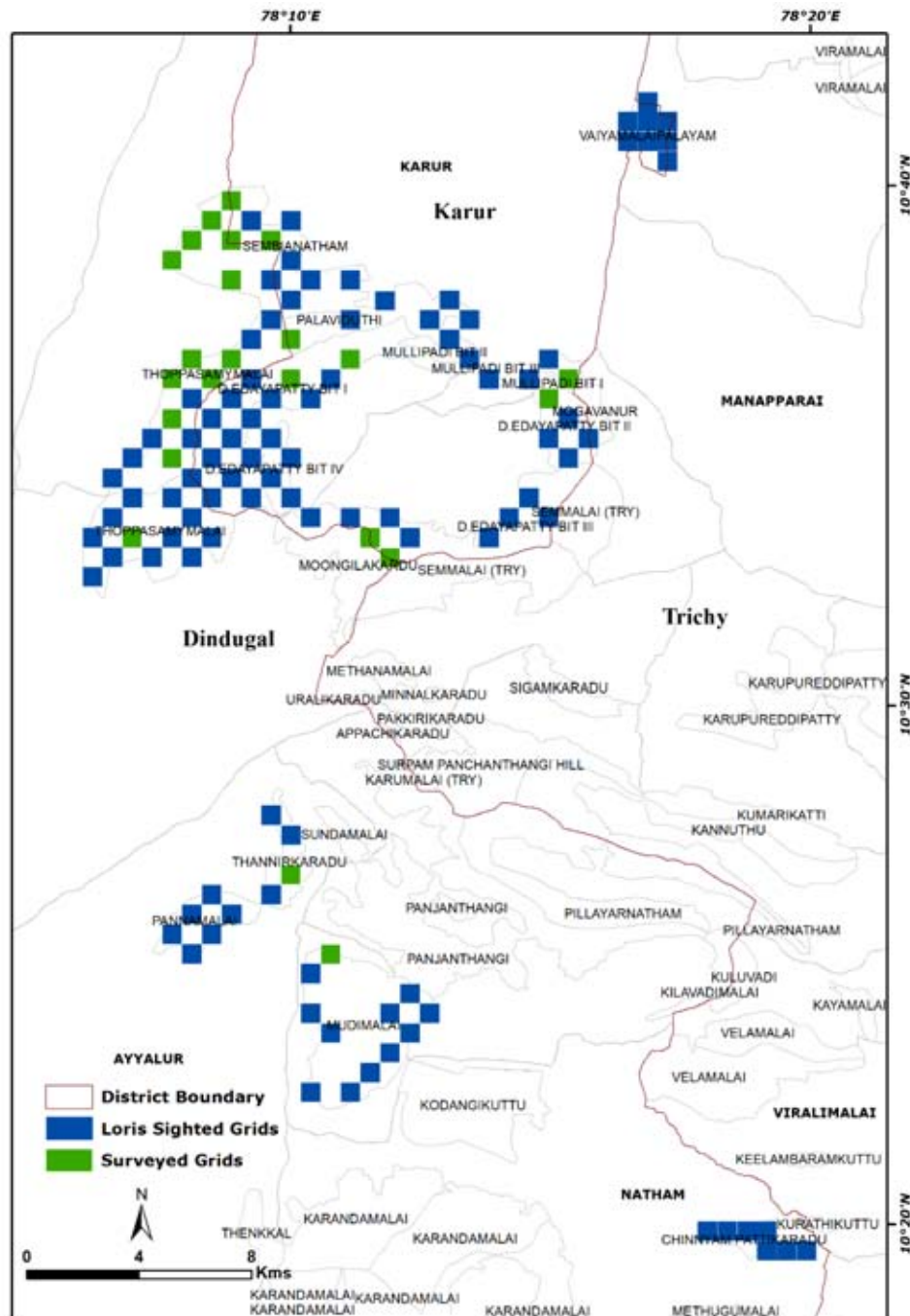


Figure 5. Surveyed grid cells with detection of slender loris in select reserved forests of Karur and Dindigul districts

Table 2. The effort to sample the slender lorises in the select reserved forests of Karur and Dindigul districts

Sl. No.	Name of Division	Name of RF	Km walked	No. of slender loris sighted
1	Dindigul	Pannamalai RF	23.57	111
2	Dindigul	Thanneerkaradu RF	9.40	23
3	Dindigul	Chinnayampatti RF	21.18	131
4	Dindigul	Thoppasamimalai RF	93.13	296
5	Dindigul	Mudimalai	42.15	121
6	Karur	D. Edayapatty- Bit-I RF	54.13	171
7	Karur	D. Edayapatty- Bit-II RF	17.42	34
8	Karur	D. Edayapatty- Bit-III RF	23.87	38
9	Karur	D. Edayapatty- Bit-IV RF	13.90	48
10	Karur	Mullipadi RF	8.53	30
11	Karur	Palaviduthi RF	24.04	78
12	Karur	Sembianatham RF	20.78	24
13	Karur	Vaiyamalaipalayam RF	22.00	71
		Total	374.11	1176

The same reserved forests also had the highest density of lorises among the surveyed forests i.e., 2.69, 2.48, 1.69, and 1.61 lorises per hectare in Chinnayampatti RF, Pannamalai RF, Mullipadi RF, and Vaiyamalaipalayam RF respectively. However, the population size that we extrapolated to the area of the reserved forests was in proportion to the area of the reserved forest. Thus, the Thoppasamimalai RF in Dindigul and Mullipadi RF in Karur district emerge as first and second having a population size of 4298 and 3042 lorises respectively. However, all the reserved forests surveyed had lorises with a decent population size.



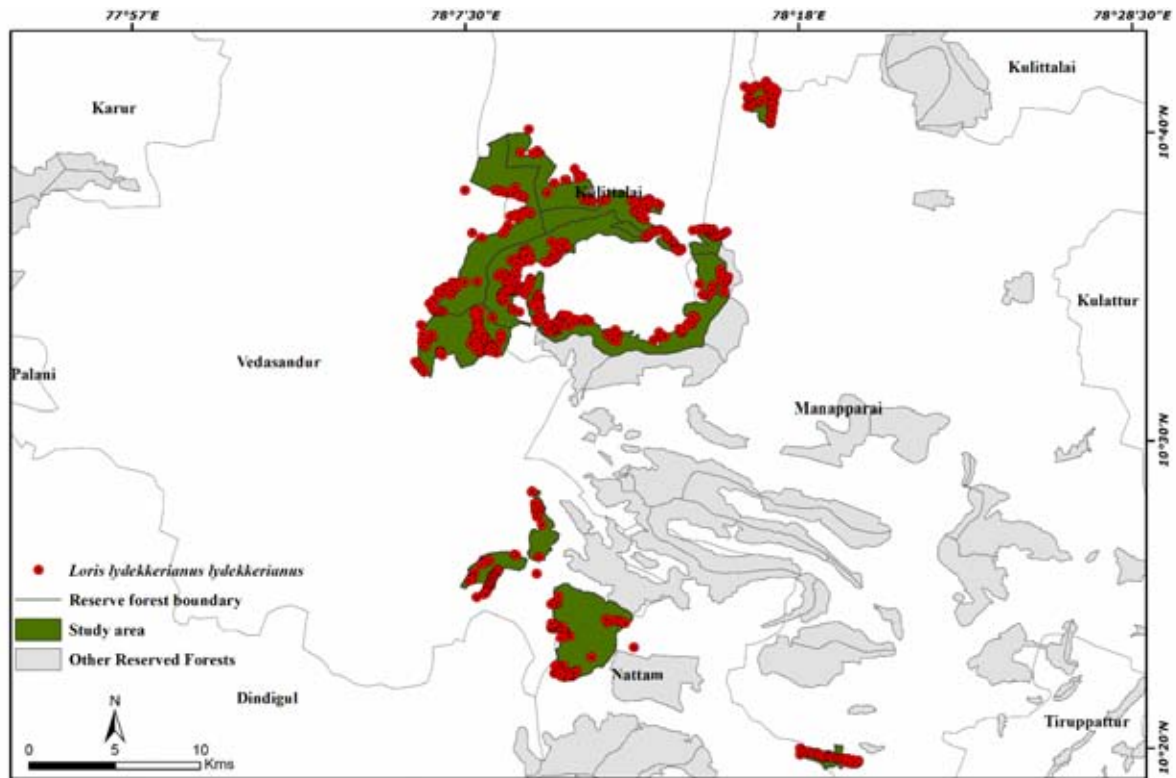


Figure 6. Detections of slender lorises in the sampled sites in the select reserved forests of Karur and Dindigul districts.

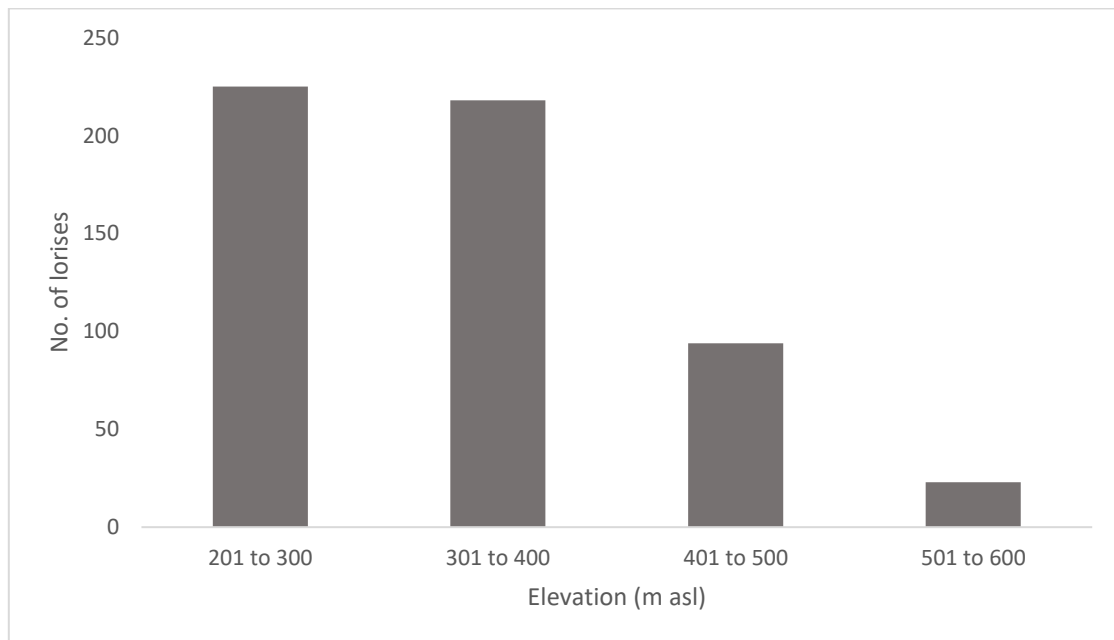


Figure 7. Number of lorises detected in different elevation gradients in Karur and Dindigul districts

Table 3. The abundance, predicted density, and population size of slender loris in the sampled reserved forests of Karur and Dindigul districts

Sl. No.	Name of Division	Name of RF	Loris abundance (No. of lorises/km (SD))	Predicted density (lorises/ha)	Predicted population size
1	Dindigul	Pannamalai RF	<b>5.83±3.72</b>	<b>2.48</b>	1165
2	Dindigul	Thanneerkaradu RF	2.20	0.72	280
3	Dindigul	Chinnayampatti RF	<b>6.22</b>	<b>2.69</b>	677
4	Dindigul	Thoppasamimalai RF	3.28± 2.26	1.15	4298
5	Dindigul	Mudimalai	3.00±2.66	1.11	1992
6	Karur	D. Edayapatty- Bit-I RF	3.74±1.36	1.47	2625
7	Karur	D. Edayapatty- Bit-II RF	2.28	0.76	306
8	Karur	D. Edayapatty- Bit-III RF	1.77±0.68	0.51	642
9	Karur	D. Edayapatty- Bit-IV RF	3.62±0.36	1.41	344
10	Karur	Mullipadi RF	<b>4.21</b>	<b>1.69</b>	3042
11	Karur	Palaviduthi RF	3.31±0.23	1.26	944
12	Karur	Sembianatham RF	1.77±0.45	0.51	490
13	Karur	Vaiyamalaipalayam RF	<b>4.04</b>	<b>1.61</b>	451

## Conservation implications

1. Since slender lorises are small, nocturnal, and insectivorous, they can survive with the insects available in the agricultural fields, on hedges or fences of agriculture fields, and on roadside trees with connectivity. Although lorises are known to occur in the agricultural field with some kind of canopy or habitat contiguity, the reserved forests cannot be ignored with the notion that lorises can survive anywhere which is not true. The survival rate of the lorises in the agricultural field or outside the forests has not been studied, but the rate of mortality due to collision with a vehicle on the road or occasionally killed by people is reported outside the forest. Thus, the population of lorises in these reserved forests acts as the **source population**.

2. Among the surveyed forests, Thoppasamimalai RF in Dindigul, and Mullipadi RF Bit-I, II and III, D Edayapatti Bit-I and IV, Palaviduthi, Sembinaatham in Karur districts are definitely an important large extent of forests with the largest population size of slender loris perhaps can be considered for notifying as a wildlife sanctuary. The Chinnayampatti RF, Pannamalai RF, and Vaiyamalaipalayam RF are also important with a high density of lorises and thus serve as important patches for conservation, thus these reserved forests can be considered for conservation reserves in the future.
3. Since the slender loris home ranges in the landscape vary between 1 hectare to 20 hectares, a minimum of 50 m to a maximum of 200 m may be considered for the eco-sensitive zone around the protected area.
4. The Chinnayampatti RF is being one of the reserved forests with the highest density of slender loris with gentle terrain, is suitable to develop for the public to visit the same can be called as “loris trail”. Small scale education tourism also can be developed.
5. Since the slender lorises in Tamil Nadu are largely confined to outside protected area networks, thus, giving importance to every reserved forest patch with lorises is important to restoring the habitat, even if they remain as reserved forests.
6. The major requirement of the slender loris is ‘forest cover with the canopy contiguity’ as they cannot jump or leap, thus requiring continuous canopy to move is important. Further, as they are not that dependent on water, focusing on water management may not be required, nevertheless, water management may be required for forest management or restoration of the habitat.
7. Earlier, the abundance of lorises was reported to be high in Tiruchirapalli, Pudukottai, Sivaganga, Karur, and Dindigul in Tamil Nadu (Kumara et al. 2016). The current survey was carried out only in Karur and Dindigul districts that too in few but important reserved forests. To prioritize the reserved forests for the conservation of slender loris, conducting the surveys in the cluster of the reserved forests of all the four districts is important as many other reserved forests may also be having much higher population size of slender lorises, or those reserved forests may be an important patch for the survival of the slender lorises as a corridor or serve as source population. Therefore, the prioritization has to be made after assessing the slender loris in reserved forests that are highlighted in Figure 8.

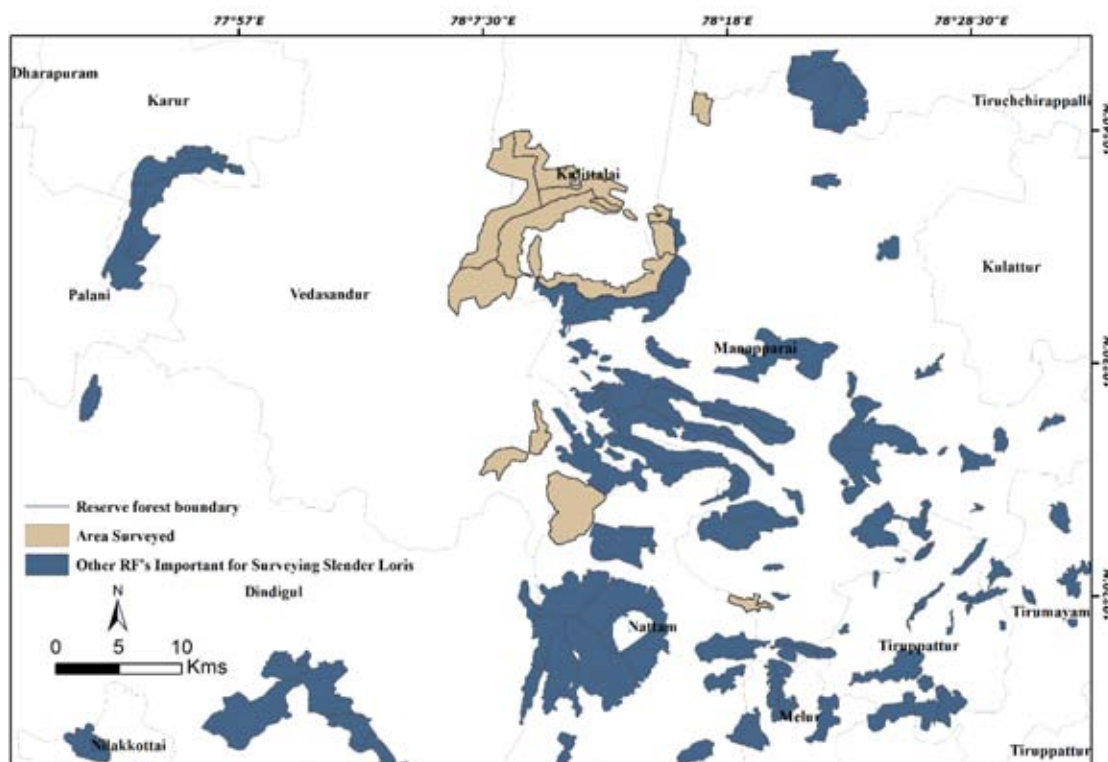


Figure 8. Other reserved forests of neighboring districts to be considered for the surveying lorises

8. A detailed study and documentation of its habitat is crucial before any manipulation of the forest from the point of habitat management. Involving one of the experts on slender loris while preparing the management plan is suggested as this is species-specific management.
9. A detailed study on the dispersal pattern of loris to the agriculture field and their survival rate is suggested to understand the management requirement of the species. Further, understanding the people's attitude towards the lorises would help the department to take the people in confidence to manage the species.
10. Developing a permanent field protocol to monitor the slender loris is required and also implementation of the same is suggested.
11. Developing awareness of the species among immediate stakeholders (people residing in and around these reserved forests and also people who are dependent on these forests).





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