

2018



Status of

**TIGERS
COPREDATORS
& PREY IN INDIA**



28.	Telangana	Amrabad	2	2
29.	Kajasthan	Zariska	-	-
30.	Kajasthan	Bantampur	22	1
32.	Kajasthan	Munkundra	-	-
34.	Odisya	Zimlipar	15	1
	Odisya	Zatkozia	-	-
	Maharashtra			
	Maharashtra			
	Maharashtra			
	Maharashtra			
	Maharashtra			
	Maharashtra			
	Maharashtra			
	Maharashtra			
	Maharashtra			
	Maharashtra			
	Maharashtra			
	Maharashtra			
	Maharashtra			
	Maharashtra			
	Maharashtra			
	Maharashtra			
	Maharashtra			
11.	Maharashtra	Banbhavgarh	154	2
10.	Jharkhand	Baraman	-	-
9.	Chhattisgarh	Udanti Zitanadi	-	-
8.	Chhattisgarh	Indravati*	3	-
7.	Chhattisgarh	Achankamar	-	-
6.	Andhra Pradesh	Zizailam Nagarjunasagar	43	2

Central India and Eastern Ghats

2.	Uttarakhand	Kajaj	25	2
4.	Uttarakhand	Corbett	200	0
3.	Uttar Pradesh	Pilibhit	02	3
5.	Uttar Pradesh	Dudhwa	107	10
1.	Bihar	Valmiki	33	1

Zhivalik Hills and Gangetic Plains

State	Reserve Tiger	Number Tiger	SE	Number Tiger
		the Tiger Reserve	Tigers utilizing	Tiger

the year 2018-19,
in tiger reserves for
estimates of tiger
Population

Table 3.4

	State	Tiger Reserves	Tigers utilizing the Tiger Reserve		Tigers within the Tiger Reserve	
			Tiger Number	SE	Tiger Number	SE
36.	Kerala	Periyar	33	6	26	0.46
37.	Tamil Nadu	Anamalai	25	3	20	0.23
38.	Tamil Nadu	KMTR	8	1	7	0.01
39.	Tamil Nadu	Mudumalai	162	10	103	0.38
40.	Tamil Nadu	Sathyamangalam	126	6	83	2
NE Hills and Brahmaputra Plains						
41.	Arunachal Pradesh	Kamlang [#]	-	-	4	1
42.	Arunachal Pradesh	Namdapha [#]	-	-	11	1
43.	Arunachal Pradesh	Pakke	-	-	3	-
44.	Assam	Kaziranga	135	7	104	10
45.	Assam	Manas	31	2	31	2
46.	Assam	Nameri	-	-	3	-
47.	Assam	Orang	21	3	21	2.8
48.	Mizoram	Dampa	-	-	0	-
49.	West Bengal	Buxa	-	-	0	-
Sundarban						
50.	West Bengal	Sundarban	106	4	88	2

#: MaxEnt model result; *: scat DNA result

** Same three tigers in Nameri and Paake. In some tiger reserves that abut each other (Bandipur, Madumalai, and Sathyamangalam; Pench – Madhya Pradesh and Pench - Maharashtra) individual tigers could be double counted. These double counts are accounted for in estimating the tiger population at the landscape and State scale. In order to minimize double count of tigers the estimate of “Tigers within Tiger Reserves” is to be used.

© Y. Jhala



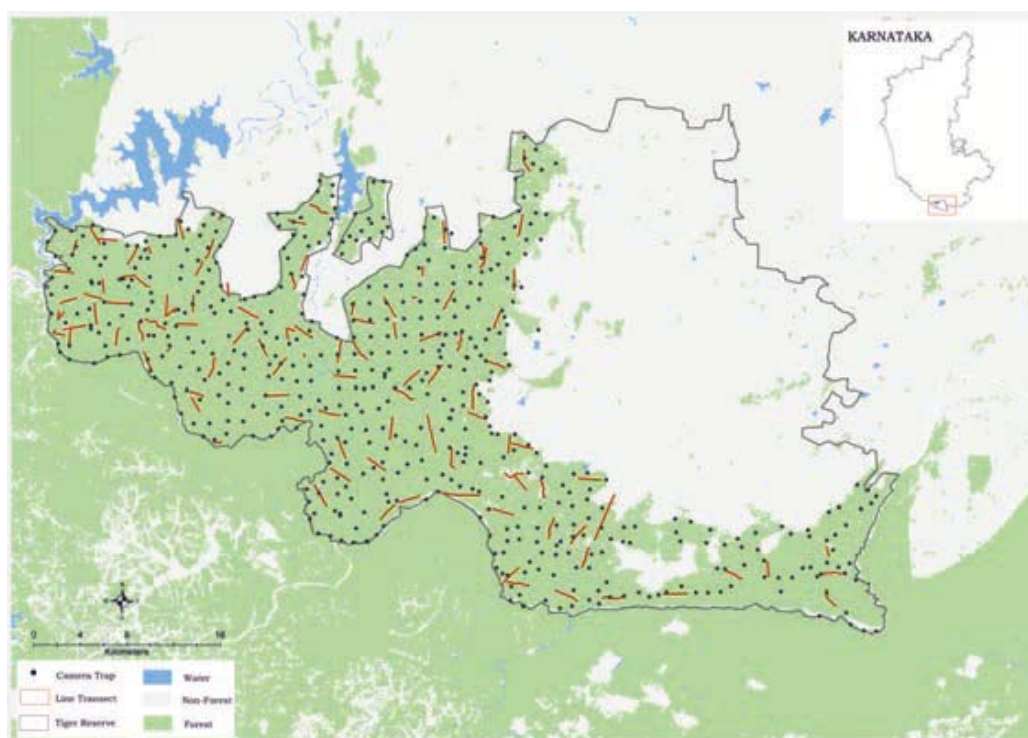
BANDIPUR TIGER RESERVE

INTRODUCTION

Bandipur Tiger Reserve in Karnataka is a 912 km² protected area predominantly consisting of tropical deciduous forests and dry-deciduous scrub forests. Bandipur was declared as a national park in the year 1974. The National Park is situated at 76° 45' E and 11° 48' N. It receives an annual rainfall of 700-1200mm. Bandipur supports four habitat types: dense forest, woodland to savanna woodland, tree savanna and scrub woodland and dense thicket. The areas surrounding the park have large anthropogenic habitat modifications such as agricultural lands, plantations and pasture lands. There are over 156 villages located around the park, supporting a population of 1, 26,000 people and livestock population of 1,16,000. The forests of Malenad landscape in the Western Ghats supports large assemblages of carnivores and herbivores: tiger (*Panthera tigris*), leopard (*Panthera pardus*), Asiatic wild dog (*Cuon alpinus*) and sloth bear (*Melursus ursinus*), Asiatic elephant (*Elephas maximus*), gaur (*Bos gaurus*), sambar (*Rusa unicolor*), chital (*Axis axis*), muntjac (*Muntiacus vaginalis*), four-horned antelope (*Tetracerus quadricornis*), wild pig (*Sus scrofa*), mouse deer (*Moschiola indica*) and hanuman langur (*Semnopithecus entellus*).

Figure 11.12

Camera trap and transect layout in Bandipur Tiger Reserve, 2018-19



RESULTS

Tiger Density Estimates

A total of 534 camera traps were deployed in Bandipur Tiger Reserve yielding 1,479 tiger detections (including 127 photos of cubs) from which 126 individual tigers were identified. Density of tigers in the Tiger Reserve was estimated to be 7.70 (SE 0.71) per 100 km² (Table 11.4). The detection corrected tiger male to female sex ratio in Bandipur was 0.41:0.59 (Table 11.4).

Variables	Estimates
Model space (km ²)	2029.12
Camera points	534
Trap nights (effort)	20512
Unique tigers captured	126
Model	g_0 (sex) σ (sex) Pmix (sex)
\hat{D} SECR (per 100 km ²)	7.70 (0.71)
σ Female (SE) km	1.70 (0.04)
σ Male (SE) km	2.85 (0.07)
g_0 Female (SE)	0.01 (0.001)
g_0 Male (SE)	0.01 (0.0007)
Pmix Female (SE)	0.59 (0.04)
Pmix Male (SE)	0.41 (0.04)

SE: Standard error

\hat{D} SECR: Density estimate from Maximum Likelihood based spatially explicit capture recapture

σ (Sigma): Spatial scale of detection function,

g_0 : Magnitude (intercept) of detection function

Pmix: Detection corrected estimate of proportion of males and females

Table 11.4

Sampling details and tiger density parameter estimates using spatially explicit capture recapture analysis in a likelihood framework for Bandipur Tiger Reserve, 2018-19.

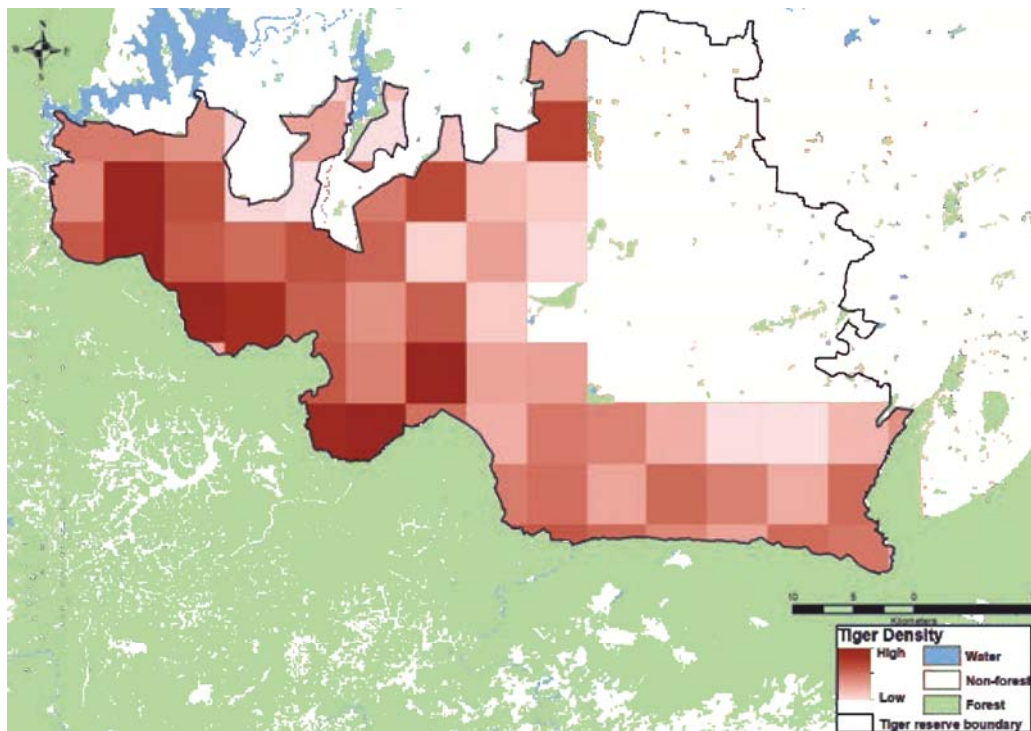


Figure 11.13

Spatial density map of tigers in Bandipur Tiger Reserve, 2018-19

Tigers were more or less evenly distributed within the critical tiger habitat of Bandipur Tiger Reserve. Some high density pockets were seen along the southern and western parts of the Tiger Reserve (Mooleholle, Gundre and N. Begur areas).

Prey Density Estimates

A total of 325 transects were sampled in Bandipur Tiger Reserve which amounted to an effort of 603.53 km. Chital was found to be the most abundant ungulate followed by barking deer and sambar in Bandipur Tiger Reserve (Table 11.5).

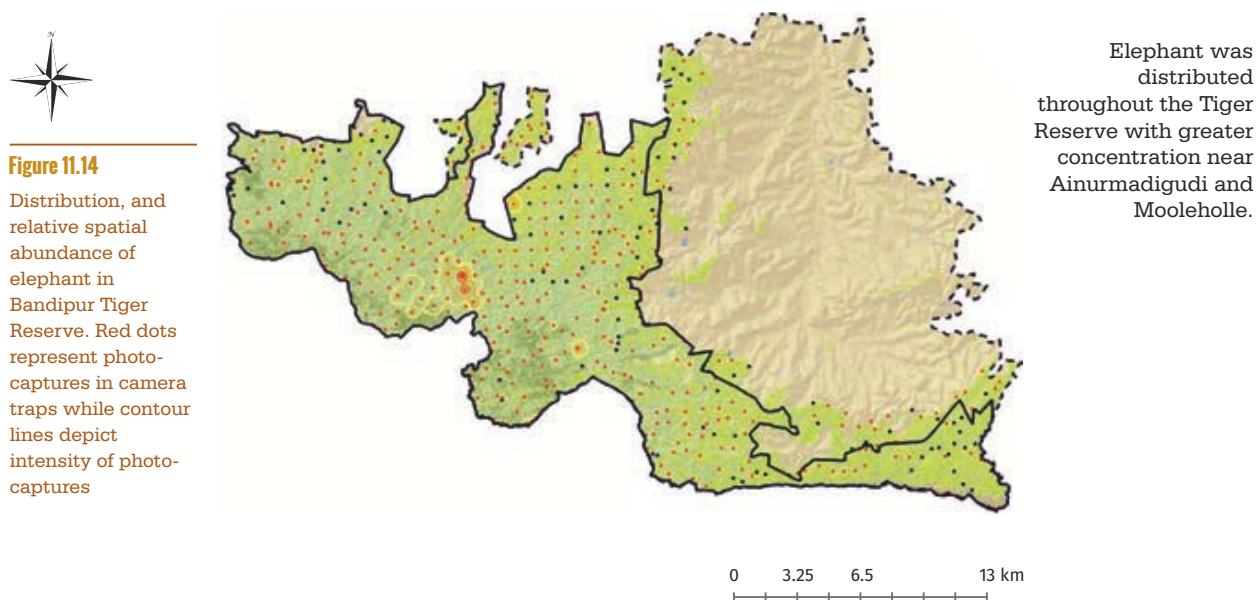
Table 11.5

Model statistics and parameter estimates of line transect (n=325, Total effort 603.53 km) based distance sampling for prey species in Bandipur Tiger Reserve, 2018-19

Species	Effective strip width (SE)	#groups detected	Mean group size (SE)	Detection probability (SE)	Encounter rate(SE)	Group density/sq.km (SE)	Individual density/sq.km (SE)
Chital	30.67 (0.90)	277	6.9 (0.36)	0.12 (0.004)	0.45	7.48 (1.58)	51.72 (11.25)
Sambar	31.08 (1.22)	147	1.8 (0.06)	0.06 (0.002)	0.24	3.91 (0.81)	7.27 (1.52)
Gaur	33.20 (2.14)	16	2.1 (0.35)	0.11 (0.007)	0.02	0.39 (0.10)	0.84 (0.26)
Elephant	47.62 (2.82)	74	2.2 (0.20)	0.12 (0.007)	0.12	1.28 (0.28)	2.95 (0.71)
Wild pig	27.54 (1.98)	14	4.8 (0.86)	0.09 (0.007)	0.02	0.42 (0.13)	2.04 (0.75)
Barking deer	25.88 (1.33)	96	2.8 (0.21)	0.08 (0.004)	0.15	3.07 (0.56)	8.7 (1.7)

Distribution of Major Mammalian Fauna Found in Bandipur Tiger Reserve

Herein, we use photo-captures from camera traps to depict species' spatial distribution and intensity of habitat use. The following maps depict camera trap layout and species capture rates. The black outline on the map represents the core area of Bandipur Tiger Reserve.



Gaur was distributed throughout the Tiger Reserve with greater concentration near Ainurmadigudi area.

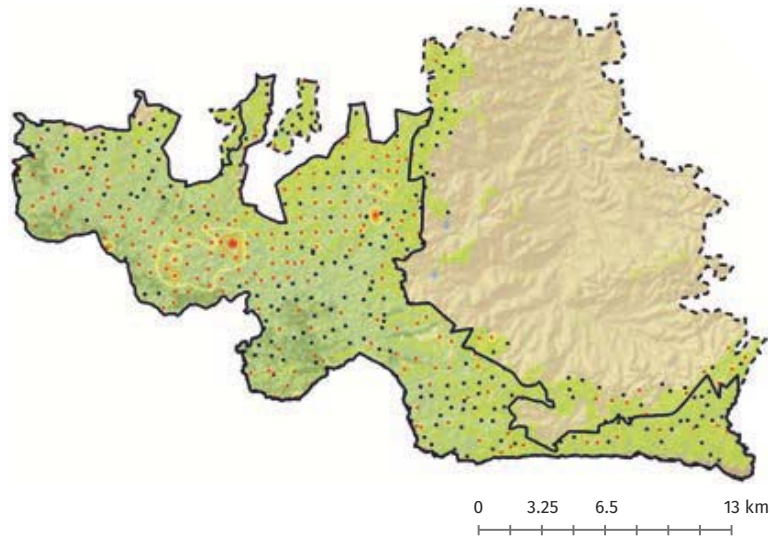


Figure 11.15

Distribution, and relative spatial abundance of gaur in Bandipur Tiger Reserve. Red dots represent photo-captures in camera traps while contour lines depict intensity of photo-captures

Chowsingha had a widespread distribution in Bandipur Tiger Reserve with larger concentration of photo-captures from Kundakere (Moyar) area.

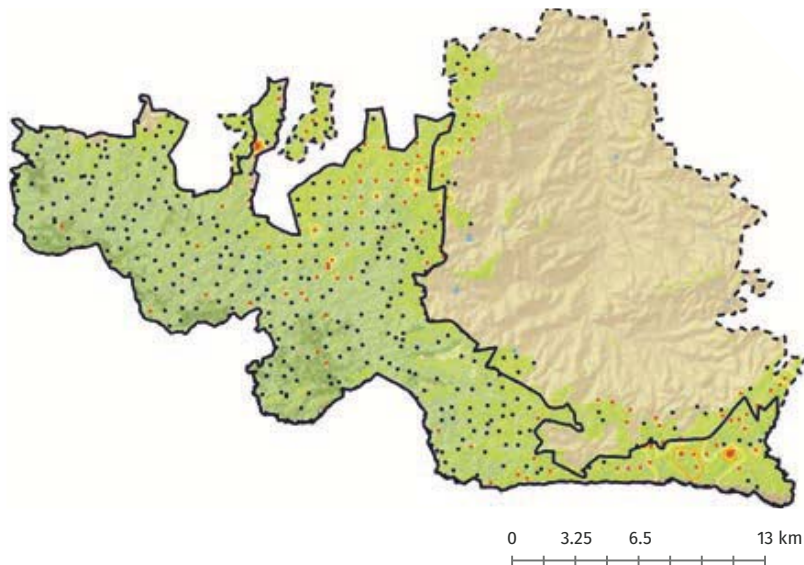


Figure 11.16

Distribution, and relative spatial abundance of chowsingha in Bandipur Tiger Reserve. Red dots represent photo-captures in camera traps while contour lines depict intensity of photo-captures.

Mouse deer was distributed from throughout the Tiger Reserve with greater concentration of photo-captures from Gopalswamy Betta area of the tiger reserve.

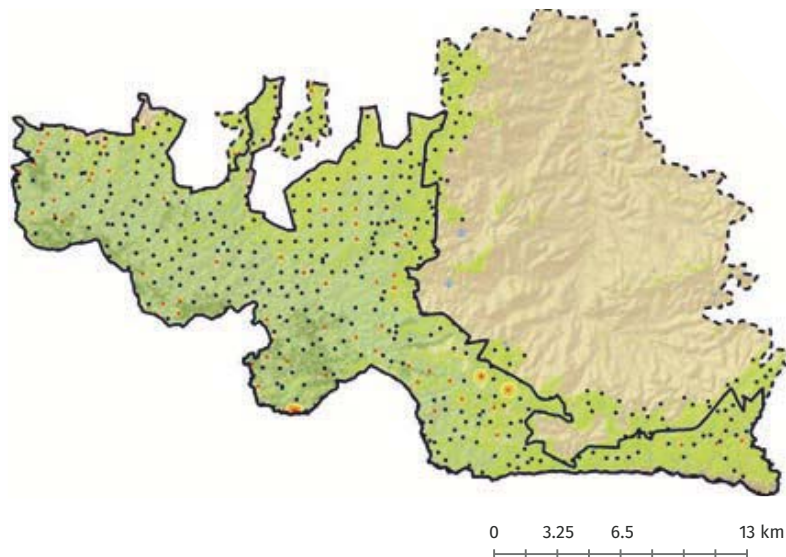


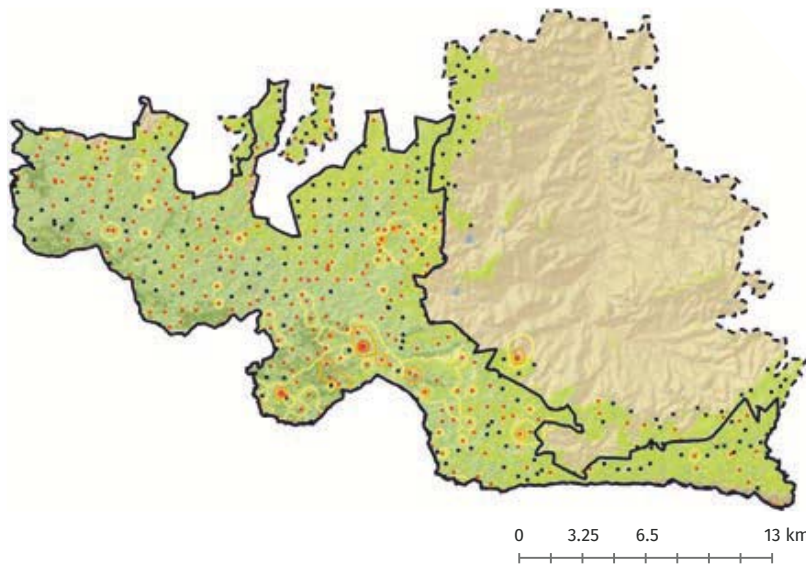
Figure 11.17

Distribution, and relative spatial abundance of mouse deer in Bandipur Tiger Reserve. Red dots represent photo-captures in camera traps while contour lines depict intensity of photo-captures



Figure 11.18

Distribution, and relative spatial abundance of leopard in Bandipur Tiger Reserve. Red dots represent photo-captures in camera traps while contour lines depict intensity of photo-captures

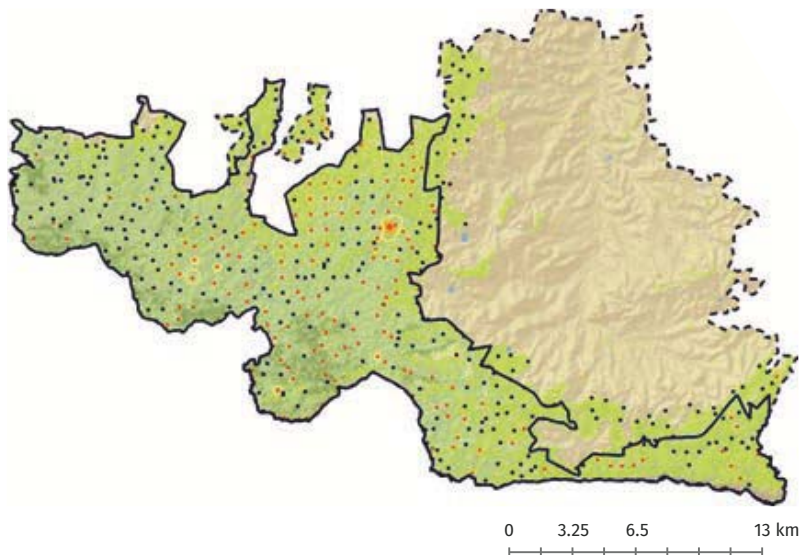


Leopards were uniformly distributed in the Tiger Reserve with larger concentration towards the periphery of the park.



Figure 11.19

Distribution, and relative spatial abundance of dhole in Bandipur Tiger Reserve. Red dots represent photo-captures in camera traps while contour lines depict intensity of photo-captures

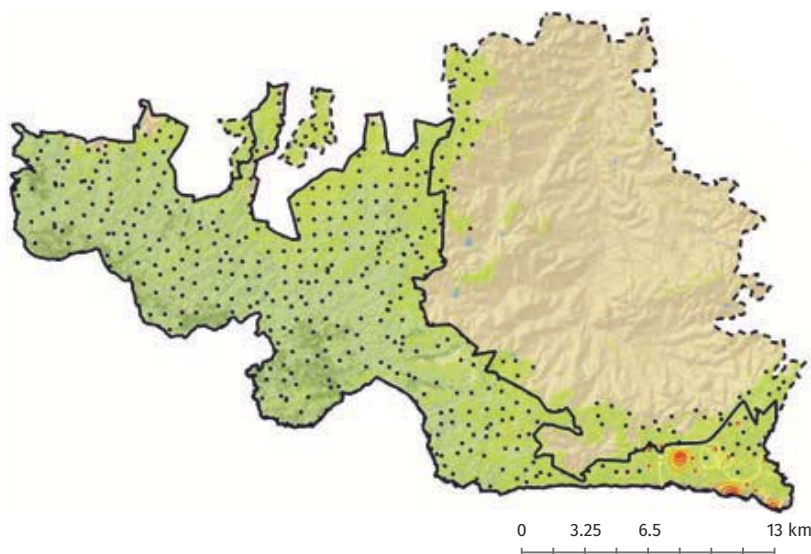


Dholes were distributed in all areas of the Tiger Reserve.



Figure 11.20

Distribution, and relative spatial abundance of hyena in Bandipur Tiger Reserve. Red dots represent photo-captures in camera traps while contour lines depict intensity of photo-captures



Hyena had a limited distribution in the Kundekere (Moyar) area of the Tiger Reserve.

Sloth bear photo-captures were maximum from western part of the Tiger Reserve (Gundre, N. Begur, Ainurmarigudi areas).

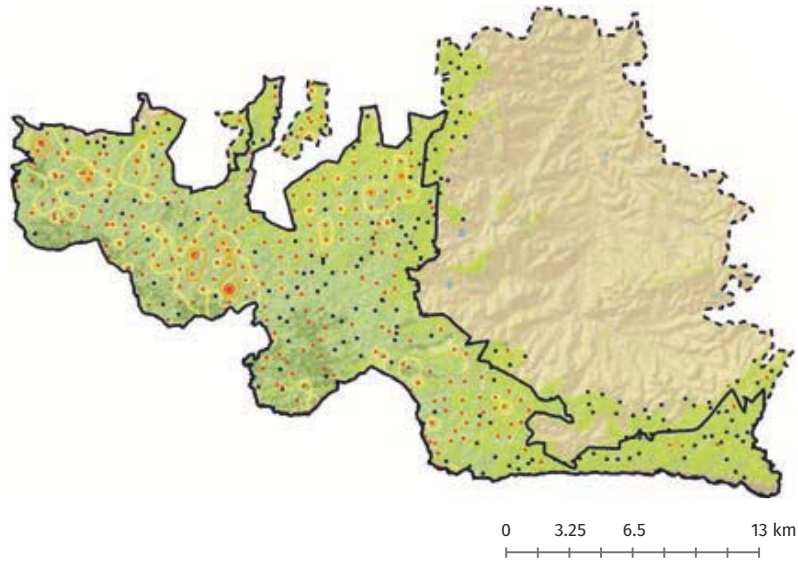


Figure 11.21

Distribution, and relative spatial abundance of sloth bear in Bandipur Tiger Reserve. Red dots represent photo-captures in camera traps while contour lines depict intensity of photo-captures

Jungle cats were photo-captured from all areas of the Tiger Reserve including the buffer areas of Gundlupet.

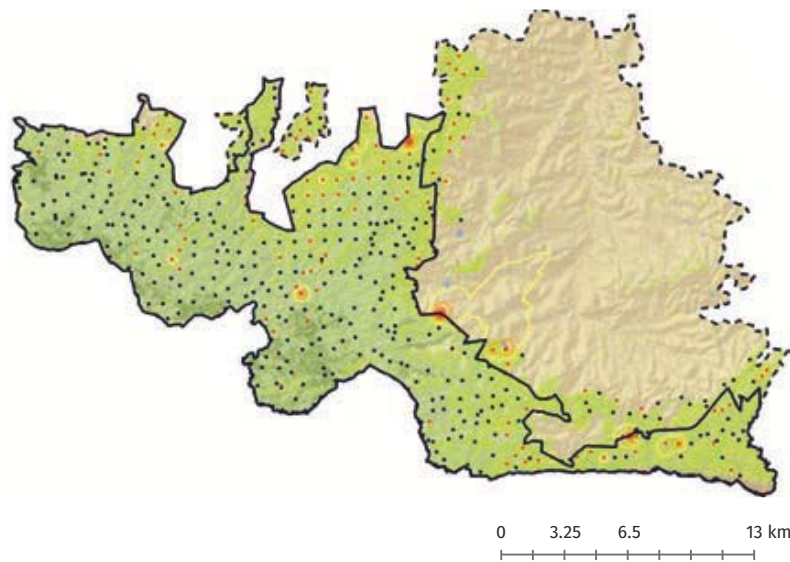


Figure 11.22

Distribution, and relative spatial abundance of jungle cat in Bandipur Tiger Reserve. Red dots represent photo-captures in camera traps while contour lines depict intensity of photo-captures

Rusty spotted cats were photo-captured from all parts of the Tiger Reserve.

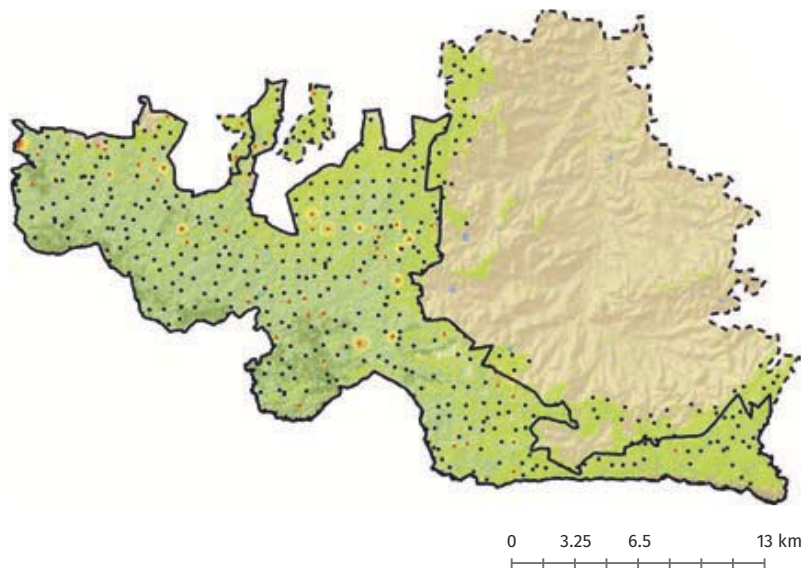


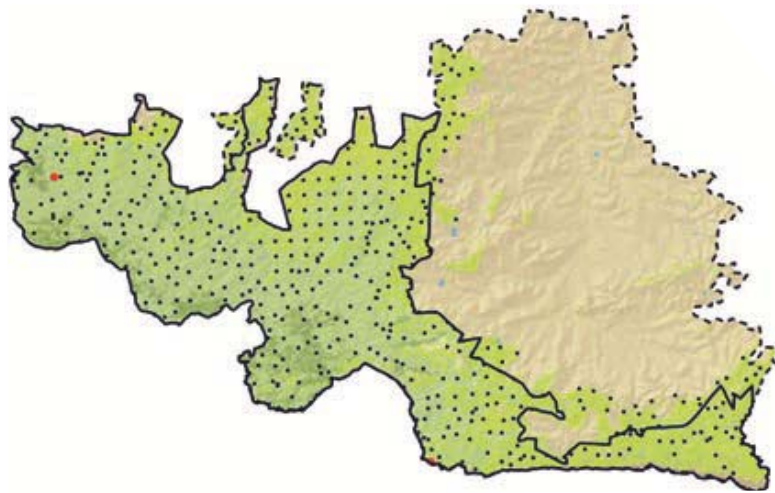
Figure 11.22

Distribution, and relative spatial abundance of rusty spotted cat in Bandipur Tiger Reserve. Red dots represent photo-captures in camera traps while contour lines depict intensity of photo-captures



Figure 11.24

Distribution, and relative spatial abundance of leopard cat in Bandipur Tiger Reserve. Red dots represent photo-captures in camera traps while contour lines depict intensity of photo-captures

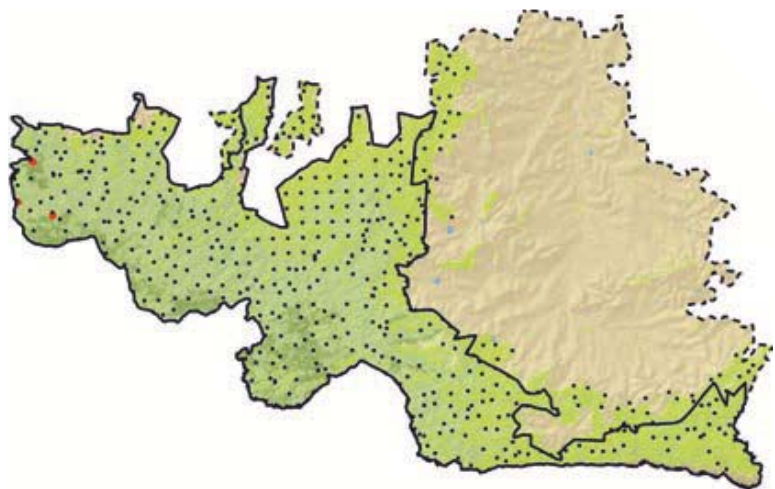


Leopard cat had only one photo-capture from the Tiger Reserve and the reason behind its poor status needs to be investigated.



Figure 11.25

Distribution, and relative spatial abundance of golden jackal in Bandipur Tiger Reserve. Red dots represent photo-captures in camera traps while contour lines depict intensity of photo-captures



Jackals had only three photo-captures from the Tiger Reserve and the reason behind its poor status and decline needs to be investigated.

Relative Abundance of all Photocaptured Species in Bandipur Tiger Reserve

A total of 36 species of ungulates, carnivores, domestic animals, omnivores, and galliformes were photo-captured in the tiger reserve. Chital was the most commonly photo-captured (Table 11.6). Pangolin was the rarest species photo-captured followed by leopard cat.

Species	No. of photos per 100 trap nights	No. of trap nights required to get single capture
Barking deer	1.10	91
Blackbuck	0.38	266
Black-naped hare	21.35	5
Bonnet macaque	0.99	101
Brown mongoose	0.18	570
Brown palm civet	0.01	6837
Chital	53.09	2
Common palm civet	2.37	42
Domestic cat	0.08	1282
Domestic dog	0.30	331
Elephant	15.28	7
Four horned antelope	2.92	34
Gaur	6.26	16
Golden jackal	0.01	6837
Grey jungle fowl	1.39	72
Hanuman langur	5.02	20
Indian fox	0.01	6837
Indian grey mongoose	0.76	132
Indian pangolin	0.01	10256
Indian porcupine	5.82	17
Jungle cat	1.54	65
Leopard	5.28	19
Leopard cat	0.01	6837
Livestock	3.01	33
Mouse deer	0.85	118
Peafowl	18.43	5
Ruddy mongoose	0.38	263
Rusty spotted cat	0.45	223
Sambar	14.07	7
Sloth bear	4.10	24
Small Indian civet	3.20	31
Stripe-necked mongoose	0.61	164
Striped hyena	0.09	1080
Tiger	7.21	14
Wild dog	1.84	54
Wild pig	4.72	21

Table 11.6

Details of all photocaptured species and their relative abundance index (RAI) in Bandipur Tiger Reserve, 2018-19.

DISCUSSION

Tiger population in Bandipur Tiger Reserve has increased from previous estimates of 2014 primarily due to better protection and habitat management in the area by Karnataka Forest Department. Human pressures on the Park such as livestock grazing and fuel wood collection is high with about 200 villages located within 5 km of the Reserve boundary. Two highways, viz., the Mysore-Ooty highway and Gundulpet-Sultan Bathery highway are a major disturbance to wildlife in the area which need to be appropriately mitigated. Major concern in the Tiger Reserve is the loss of bamboo and large extent invasion by *Lantana*.