

Diversity and Distribution of Large Herbivore Mammals in Kawal Tiger Reserve, Telangana State

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ABSTRACT

The usage of habitat, rate of growth, dispersion, and the reaction of a population to management activities are all factors in estimating the richness of wild animals. However, because there are so many real-world field issues, determining the densities of herbivore animals in the forest is challenging. The current study is conducted in Kawal Tiger Reserve, northeast of Telangana, to estimate the number of big herbivore mammals and learn more about how these animals use various habitats. The direct sighting and line transect methods were applied to collect systematic data. 7 species of large herbivore viz. Bluebull, Four-horned Antelope, Indian Gaur, Spotted Deer, Sambar Deer, Indian Gazelle, Wild boar were observed during the surveys. Based on the information, the habitat preferences of different large herbivore species in the study area is assessed. Results shows the richness of the species is abundant in the study area due to availability of sufficient food resources, sufficient water resources. No adverse increase or decrease in the quantity of sightings annually. Even if there have been a few local hunting occurrences, they are not noteworthy nor do they appear to have any impact on the extinction of species. It may also lamentably state that our carnivore density is really low.

Keywords: Kawal Tiger Reserve, Large Herbivores, Population Density, Direct Evidences.

INTRODUCTION

Estimation of wild animal richness is connected with use of habitat, rate of growth, distribution and response of a population to management actions. But assessing herbivore animal densities in the forest is complicated due to numerous practical field problems

(Anderson et al., 1979). Estimation based on direct and indirect methods of estimating herbivore animals encounter rate in tropical forests have been used (Sale et al. 1990; Karanth and Sunquist 1992; Varman and sukumar 1995; Jathanna et al. 2003; Madhusudhan et al. 2003, 2004).

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Estimates based on indirect methods usually include enumeration in direct evidences of animal dropping, scrape marks, scent marks, while direct methods use visual sightings of animal's line transect sampling is practical, efficient and relatively inexpensive for many biological populations (Anderson et al. 1979; Burnham et al. 1980; Buckland et al. 1993). Some census results suffer from lack of competent workforce, lack of care to evade duplicate enumeration resulting in artificially overstated census figures (Sale & John Singh, 1990). Ecologists have highlighted the important role those large herbivores (primates and ungulates weighing 5 kg or more) play in tropical ecosystems through their impact on forest structure, arrangement, yield, nutrient cycling, soil structure and series (McNaughton 1979; Crawley 1983). Many methods of census are assuming a random distribution of animals or at least random orientation of transect lines. In the field, animals may have a definitely tramped distribution. One example is the Axis Deer (*Axis axis*), which congregates near forest grassland ecotones and near human settlements. It may not be always practical to lay transect lines at random. The mode of carrying out transect census may also influence the results. If an observer walks on a transect, the animal may detect the observer's presence through sight or smell and move away before they are counted. If the observer goes by a vehicle the sound of the vehicle may influence the animal's reaction. Another problem is the intensity of sampling needed to achieve satisfactory results. In the course of walking transects there may not be sufficient sightings since the total distance covered is limited. If longer distances are covered, it may increase the sample size, and a vehicle may be used for the purpose. Studies were carried out during the dry season Most of the studies were carried on tiger monitoring by HyTiCoS

(Hyderabad Tiger Conservation Society), since 2001 to determine the factors influencing density estimates of the common large mammals like the Indian Gaur (*Bos gaurus*), Spotted Deer (*Axis axis*) and Sambar (*Cervus unicolor*). The many behavioural studies have been conducted on Sambar deer (*Cervus unicolor*) in captive breeding condition (Srinivasulu, 2001). Distribution Indian Gaur (*Bos gaurus*) in Kawal wildlife Sanctuary was done by (Srinivasulu, 2003). The bat diversity of Adilabad district was studied (Srinivasulu, Devender 2022). The diversity of fish fauna was also studied (Srinivasulu and K Prasad). The distribution of Indian Gaur in Kawal Tiger Reserve was carried out (Srinivasulu 1997). Even though several studies were carried out but so far there was no studies have been done on population estimation of large herbivore mammals using line transect method.

STUDY AREA

Kawal Tiger Reserve is located in North-Eastern parts of Telangana State and extend to Nirmal, Adilabad, Kumarambhim Asifabad and situated in Mancheriyal district and also having Godavari river at one side Maharastra border on other side and located around 245 km from Hyderabad state capital of Telngana, India. It lies between 19005'–19020'N and 78032'–79012'E spread in an area of 892.23 sq. km. (Fig. 1) It is one of the oldest sanctuaries in the state declared during 1965. Kawal tiger Reserve is having very diversified habits like open areas, streams, dense forest with mixed vegetation, teak dominant bamboo mixed forest, and grass lands which are the major grazing grounds for herbivore animals. Total area of Kawal Tiger Reserve is 2015.44 sq. km out of which core area is 893 sq. km. The Kawal Tiger Reserve (KTR) is extending in the districts of Nirmal, Mancherial, Adilabad and KB Asifabad Districts.

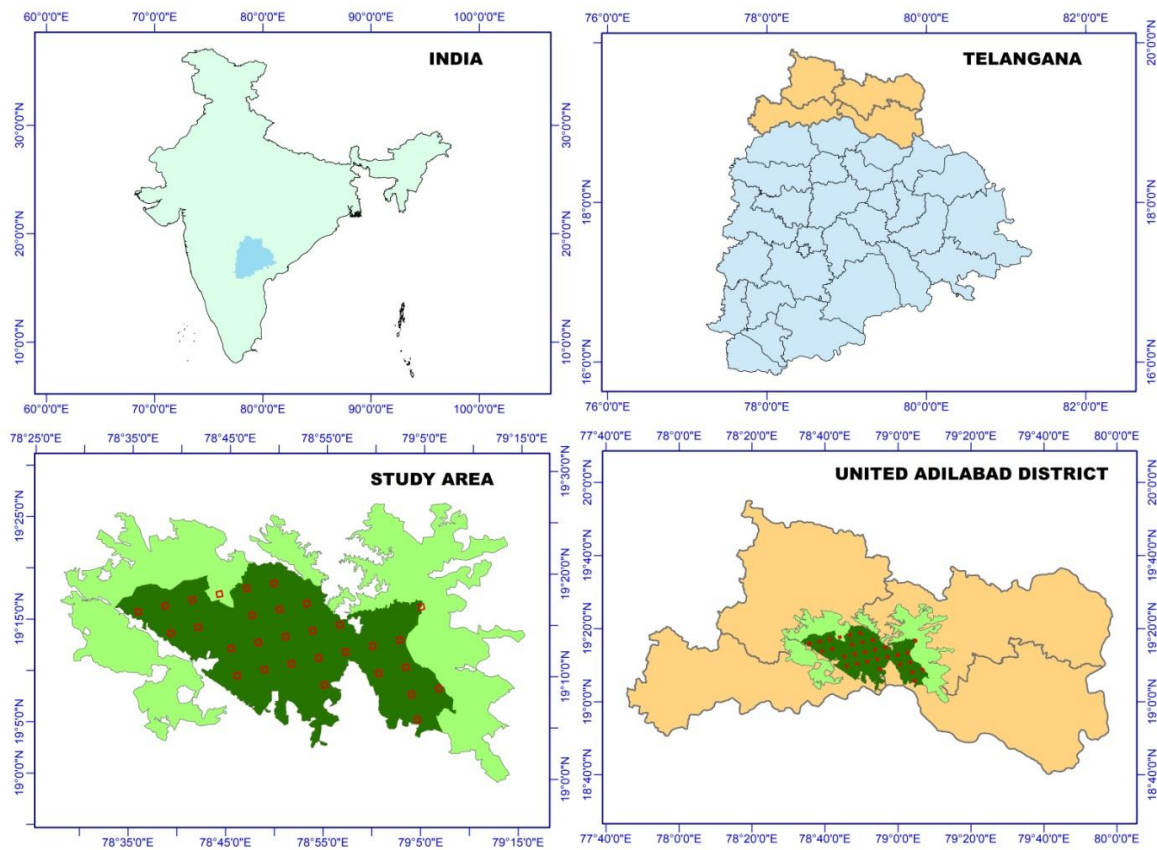


Fig. 1. Map showing Kawal Tiger Reserve

It harbours endangered fauna like Indian Gaur, Chowsingha and Grey Jungle fowl. It is known for herds of Spotted Deer, Sambar, Black Buck, Nilgai and Indian Gaur which are important tiger-prey. The vegetation in the sanctuary is a classic example of southern tropical dry deciduous forests (Champion & Seth, 1968) with predominantly and its associates like *Diospyros melanoxylon*, *Anogeissus latifolia*, *Lannea coromandelica*, *Boswellia serrata*, *Chloroxylon swietenia*, *Cleistanthus collinus*, *Terminalia alata*, *Bombax ceiba*, *Haldinia cordifolia*, *Hardwickia binata*, *Mitragyna parviflora*, *Tectona grandis*, *Strychnos nux-vomica*, *Terminalia arjuna*, etc. It protects the catchment of numerous perennial streams that ultimately drain into the river Godavari. KWS is becoming important in view of the government's decision to recommend KWS as a tiger reserve. It has enormous potential for research in conservation of biodiversity. Hence, the present study was undertaken to

describe the structure and floristic composition of the vegetation occupying the KWS

The following objectives are addressed to determine population and estimation of large herbivore mammals in Kawal tiger Reserve.

- To find out the utilization of large herbivore mammals in different habitat
- To find out distribution of large herbivore population in study area

MATERIALS AND METHODS

The study was carried out during January 2018 to January 2020 by permanent line transects laid with size of 4 km distance. The direct sighting of large herbivore line transect data has been collected systematically surveyed for all 28 transect lines and data collected on direct sighting of large herbivore animals and angle distance, perpendicular distance was recorded during sighting of animals. line transect sampling has been a common method used for obtaining estimates of wildlife abundance since the early 1930's. This method

was first developed for use in animals, especially upland game birds like goose in North America (Leopold, 1933; Hayne, 1949). The data was collected during 2018 to 2020 in the dry deciduous forest of Kawal Tiger Reserve which is located between latitude 19.066° and longitude 78.0500° in Telangana state, a part of eastern Ghats. The vegetation of this forest is dry deciduous forest (Champion & Seth 1968). Teak (*Tectona grandis*), Solid bamboo, (*Dendrocalamus strictus*), Bamboo (*Bambusa bambos*), Thirumani (*Anogeissus latifolia*), Gum Arabic tree (*Acacia nilotica*) are the most common species found covers 70% of the canopy.

We marked 28 transects in the study area with a regular interval of distance. Each line is of 4 km length covers 893 sq. km area. During the winter and summer when defoliate occurs the canopy will be open to find the animal while sampling the data. All the lines were visited 6 times for collection of the data and covered a walking effort of 672 km.

Habitat Usage

Based on the information provided, the habitat preferences of different large herbivore species in the study area can be summarized as follows:

1. Nilgai and Gaur: (Fig. 2A & 2B)
 - These species are more abundant in the backwaters of Kadem Reservoir, which is situated in the Kadem range in Khanapur Division of Nirmal district.
 - The habitat in this area is characterized as a dense teak mixed forest with bamboo patches.
 - Sufficient water resources are available in these forest patches, which is likely a critical factor for their presence.
 - These species are also found in BirsaiPET, Udumpur, and BirsaiPET ranges.
2. Spotted Deer and Wild Boar: (Fig. 2C & 2D)
 - Spotted deer and wild boar are common throughout the entire tiger reserve.

- They are adaptable and are known to feed on a variety of resources, including cotton, paddy, other crops, grass, and vegetation.
 - Their widespread presence suggests a broad range of habitat types and food sources in the reserve.
3. Sambar: (Fig. 2E)
 - Sambar are found in limited parts of the Kadem range, Jannaram, ThallapET, and BirsaiPET.
 - Their habitat is described as hilly forest patches with many water bodies, suggesting a preference for areas with a combination of elevation and water resources.
 4. Chausinga: (Fig. 2F)
 - Chausinga is primarily found in the dry grass patches of BirsaiPET, ThallapET, Indhanpally, and Pembi ranges.
 - These areas likely consist of open, grassy terrain, which is suitable for this species.
 5. Chinkara: (Fig. 2G)
 - Chinkara has a low population in the study area.
 - Sightings are more commonly observed in Indhanpally, ThallapET, Udumpur, and BirsaiPET ranges.
 - This species is associated with abundant grasslands and open forest patches, suggesting a preference for plain, open terrain.

The habitat preferences of these large herbivore species vary based on their ecological requirements. Some, like the Nilgai and Gaur, are more specific in their habitat preferences, favoring dense forests with access to water. Others, like the spotted deer and wild boar, are more adaptable and can be found throughout the tiger reserve, often foraging on crops and various vegetation. Understanding these preferences is essential for conservation efforts and managing the different species within the study area effectively.

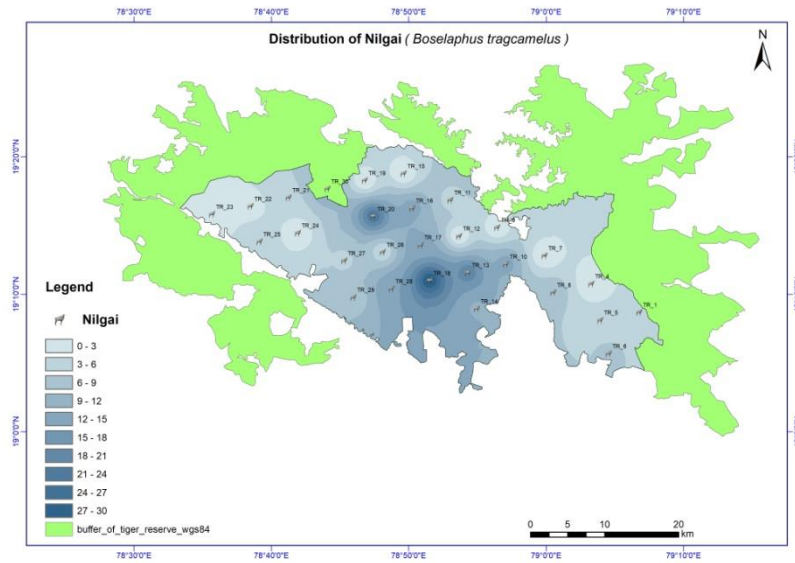


Fig. 2A. Map showing distribution of Bluebull in KTR

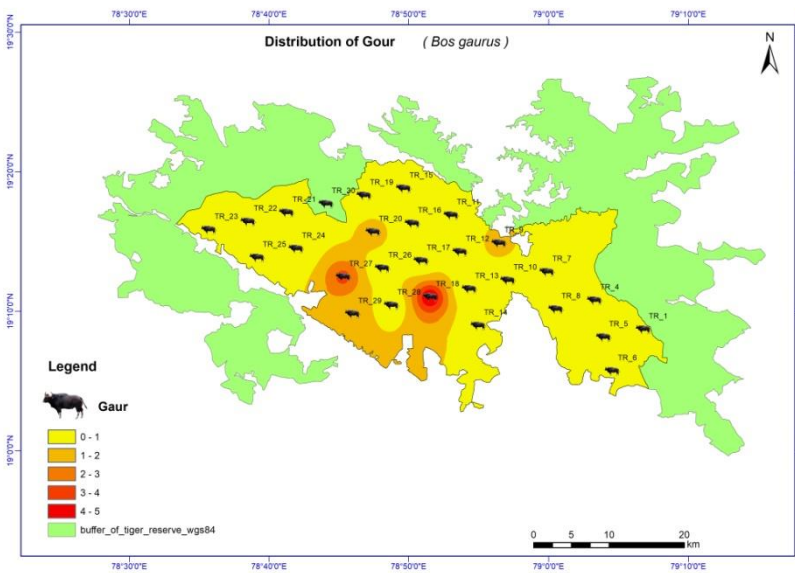


Fig. 2B. Map showing distribution of Indian Gaur in KTR

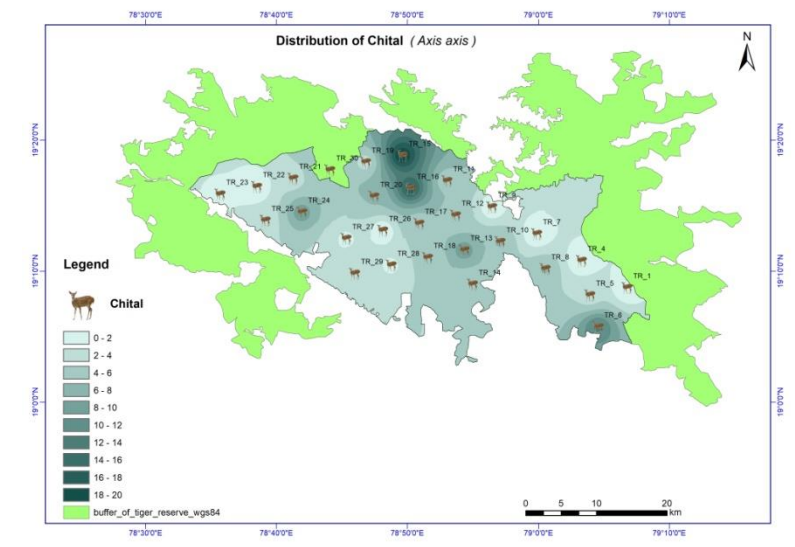


Fig. 2C. Map showing distribution of Spotted Deer in KTR

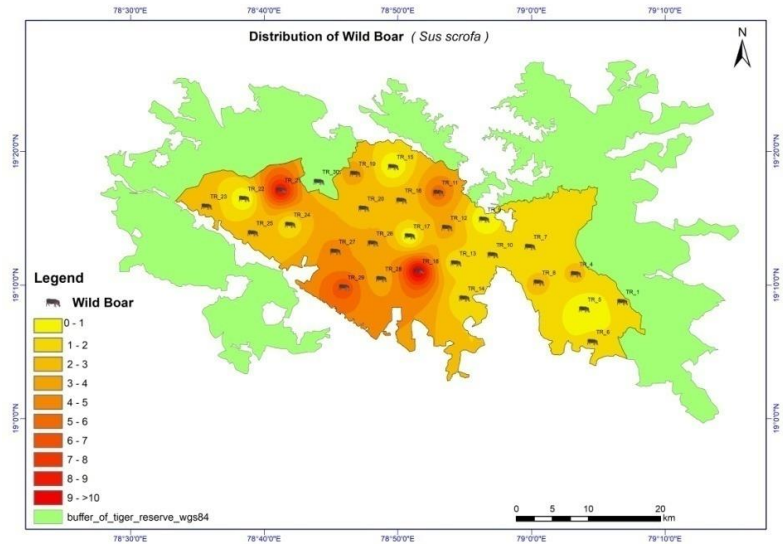


Fig. 2D. Map showing distribution of Wild Boar in KTR

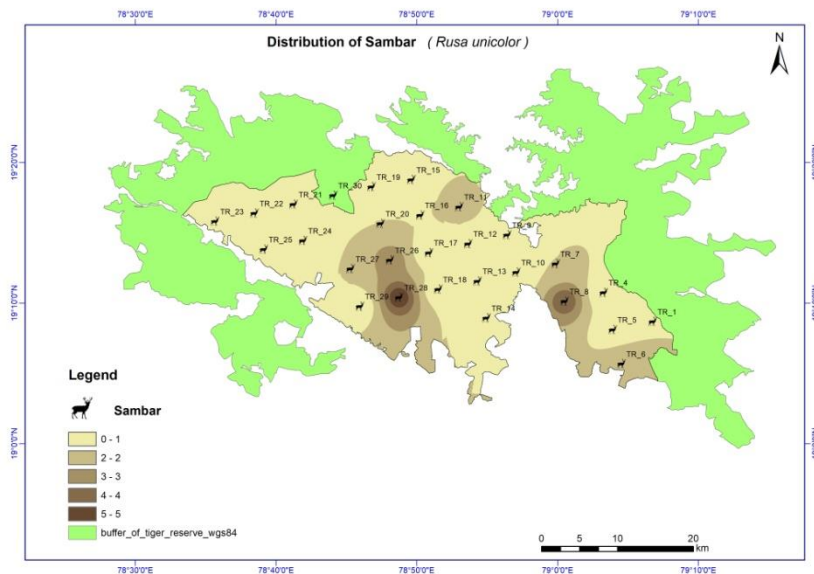


Fig. 2E. Map showing distribution of Sambar Deer in KTR

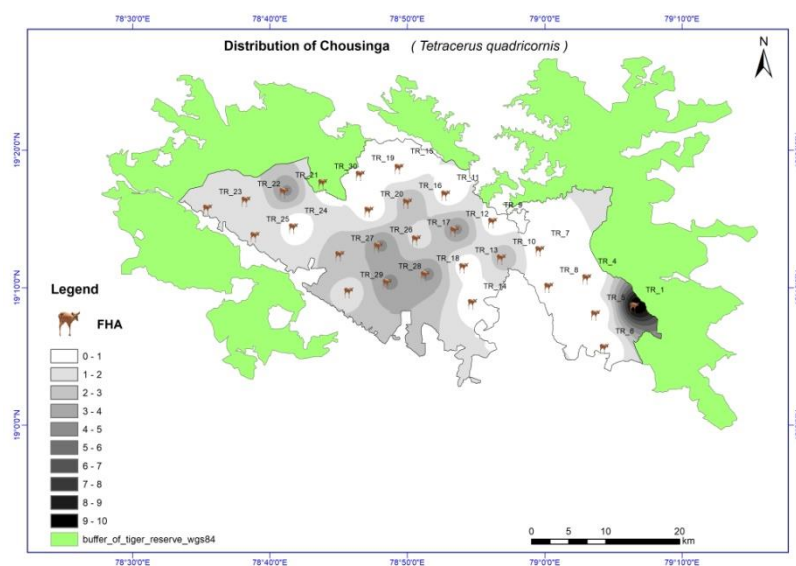


Fig. 2F. Map showing distribution of Four-horned Antelope in KTR

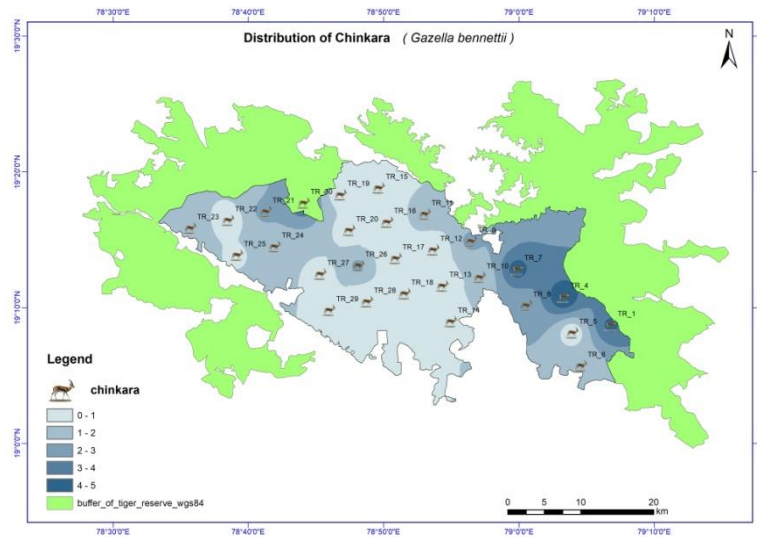


Fig. 2G. Map showing distribution of Chinkara in KTR

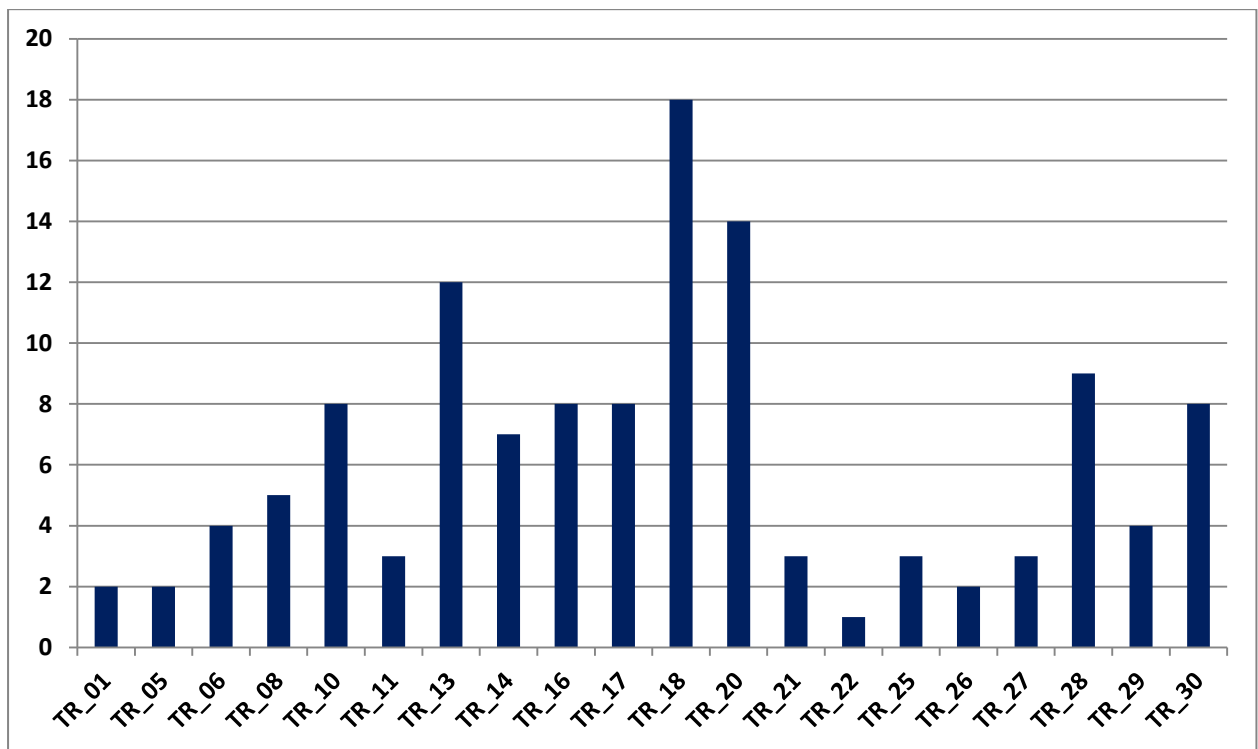


Fig. 3A. Graph showing the presence of Blue bull in the study area

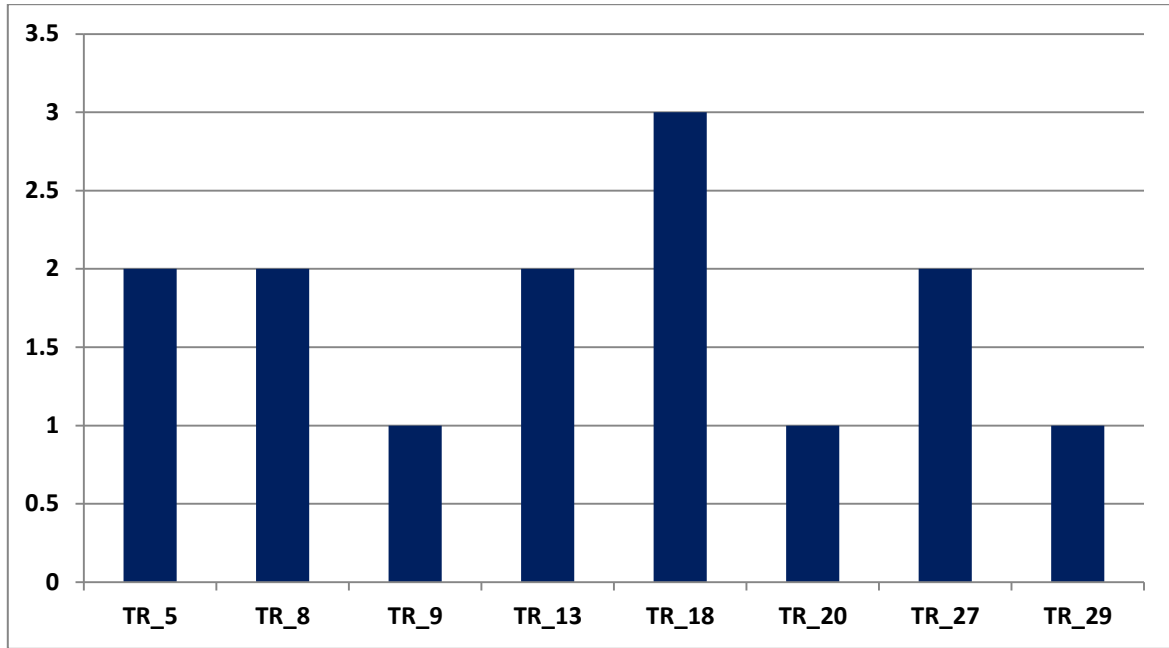


Fig. 3B. Graph showing the presence of Indian Gaur in the study area

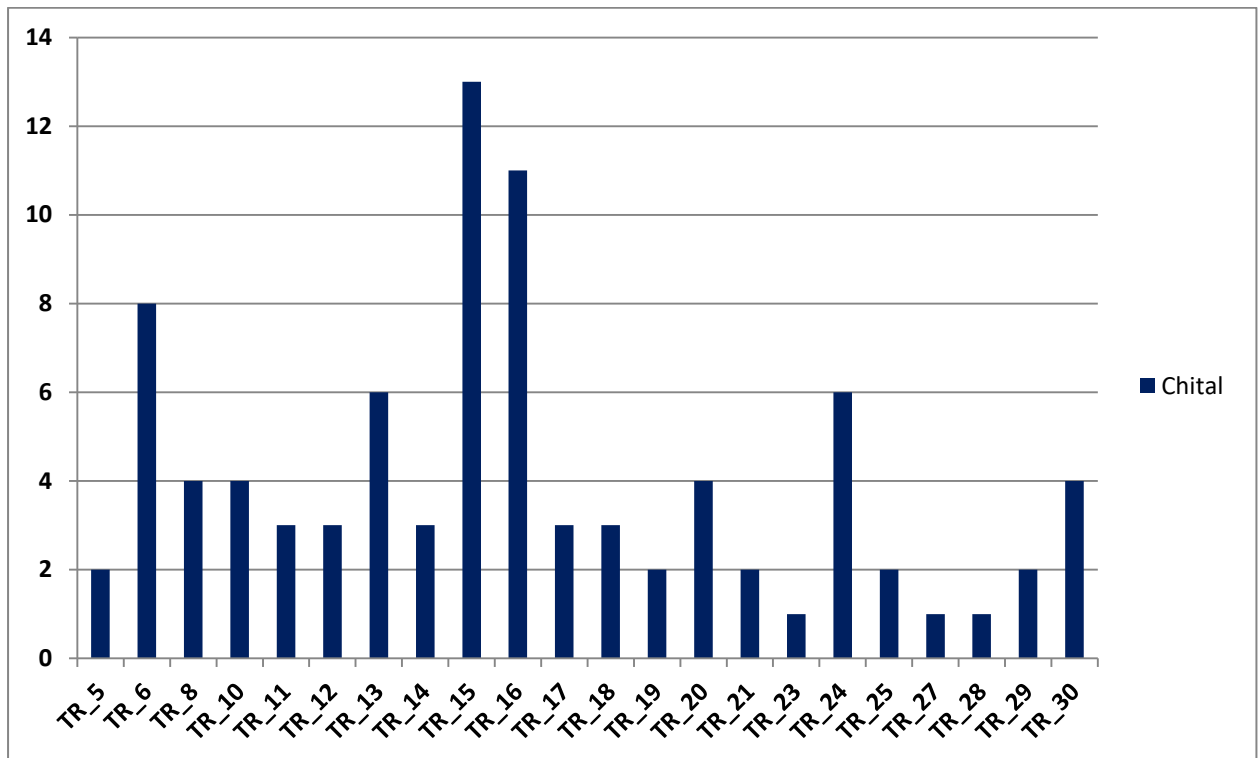


Fig. 3C. Graph showing the presence of Spotted deer in the study area

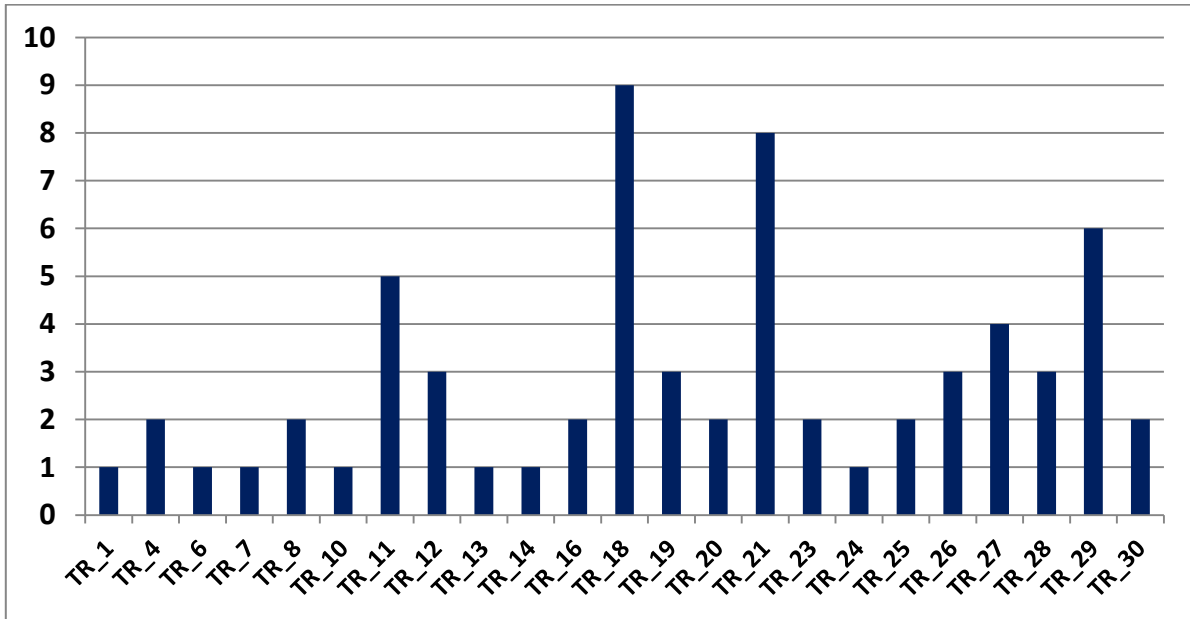


Fig. 3D. Graph showing the presence of Wild boar in the study area

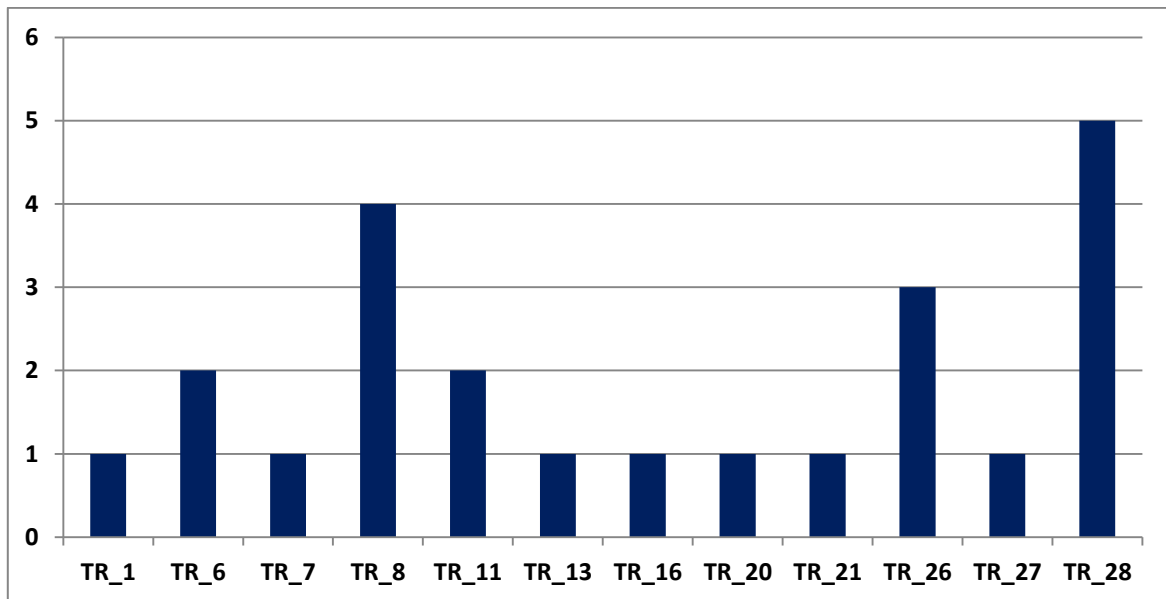


Fig. 3E. Graph showing the presence of Sambar in the study area

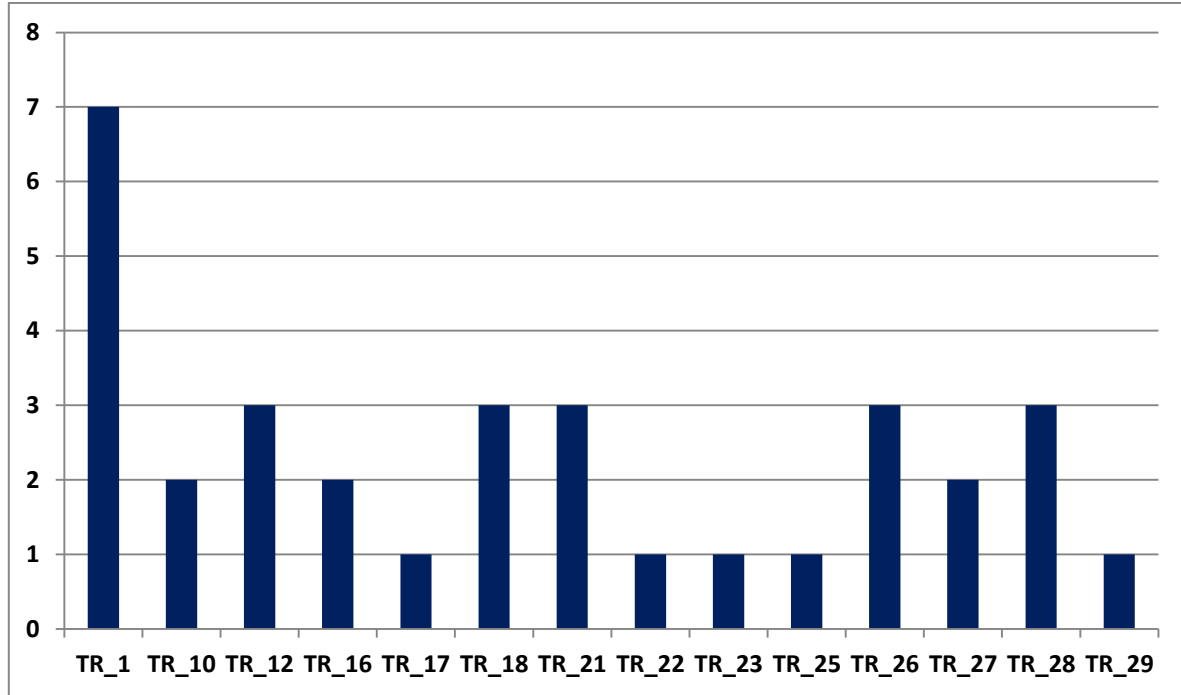


Fig. 3F. Graph showing the presence of Four-horned Antelope in the study area

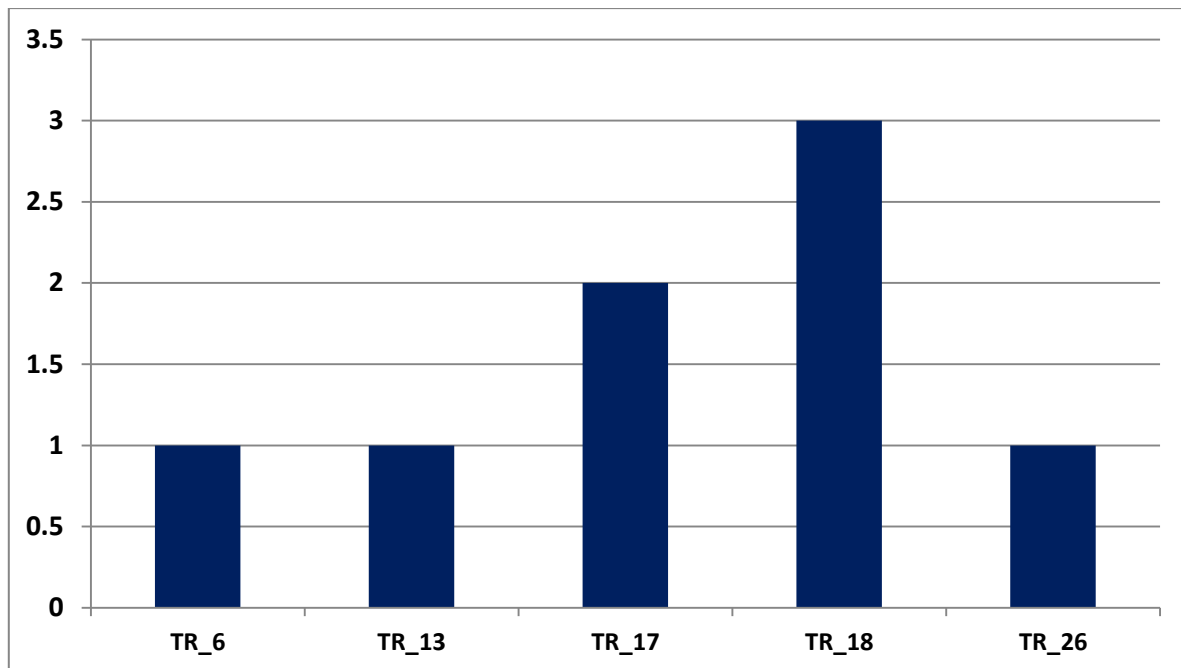


Fig. 3G. Graph showing the presence of Chinkara in the study area

RESULTS AND DISCUSSION

A total of Seven large herbivore species, Nilgai (*Boselaphus tragocamelus*), Chowsingha (*Tetraceros quadricornis*), Gaur (*Bos gaurus*), Chital (*Axis axis*), Sambar (*Rusa unicolor*), Chinkara (*Gazella bennettii*), Wild boar (*Sus scrofa*), were observed during the surveys. (Fig. 3A-3G) Nilgai, Wild boar and spotted deer were found in all over the study area includes seven ranges of core area of the

tiger reserve covering 893 sq. km. Nilgai, Chital and wild boar are predominant all over the core area. Indian Gaur is restricted to dense undisturbed and cool grass patches. Chinkara is found only

hilly grass areas of four ranges. The wild boar is widespread all over the study area and is a good prey for large carnivores such as Tiger and leopard.

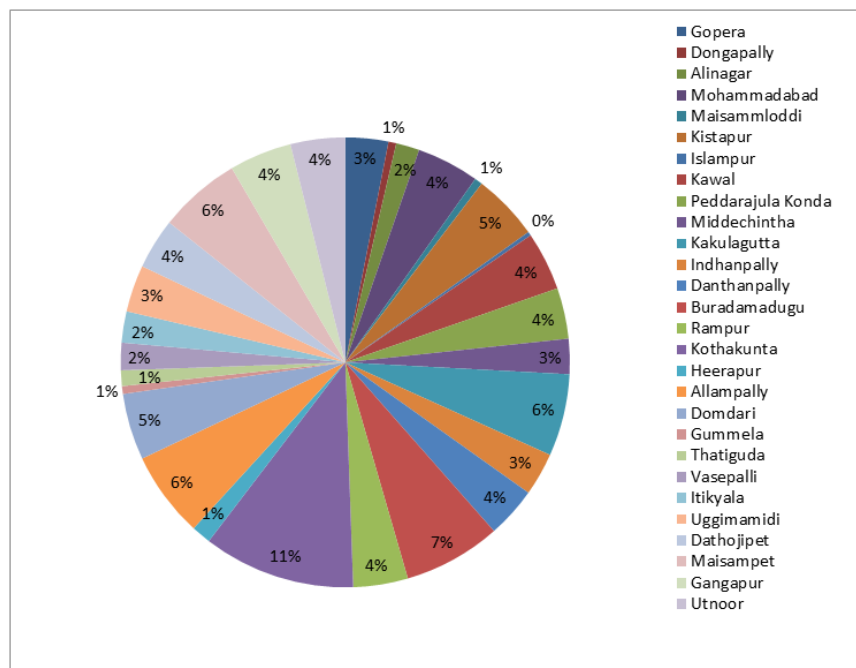


Fig. 4: Kothakunta line is with 11% of all the sightings and occupies the first place where Islampur with almost 0% is in the last place.

CONCLUSION ION

The current research reveals the diversity and distribution of large herbivore mammals in Kawal tiger reserve. The richness of the species is abundant in the study area. The food resources and the habitat are good enough for the survival of the herbivores. Sufficient water resources like percolation tanks, natural streams perennial water points, and grasslands with different types of grass species make the habitat rich in terms of availability of food and water for those animals. In our study we found there is no negative growth or decline in the number of sightings year to year. Though there were some hunting incidents occur by the local people, it is not significant and not showing any impact on the declining of species. We also can say unfortunately we have a very poor

density of carnivores which is fortunate for herbivores and not much predators are available who regulates the herbivore population. Sometimes they are killed by the formers as a part their crop protection methods such as electric fencing or sometimes by grazing pesticide applied crops. State forest department and NGOs are actively participating in making the farmers aware about the importance of the wid animals in the ecosystem and the legal consequences of killing (intentional /Unintentional) wild animals. In future we are going to continue the same work which can help us for the comparison with the earlier studies. Monitoring of the crop fields in the fringe areas to be done very frequently to avoid the deaths of the animals. Also more awareness

programs to be conducted for the people live in and around the forest areas. AI also can be used to monitor the movements of the animals for more accuracy. The optimum herbivore density should be maintained for the healthy ecosystem.

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