Distribution and Abundance of large mammals in Biligiri Rangaswamy Temple Wildlife Sanctuary

Technical Report

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Karnataka Forest Department Government of Karanataka



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Submitted to Karnataka Forest Department

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Executive Summary

Biligiri Rangaswamy Temple Wildlife Sanctuary (BRT WLS) is situated in the state of Karnataka and it has been considered as a live bridge between the Eastern and Western Ghats. The high variation in the altitude has led to diverse vegetation types varying from dry open scrub forests at lower elevation to shola forests and grass hills at higher altitude making this landscape home to a wide range of faunal diversity. The sanctuary is also a part of the larger forest complex of the region considered for the conservation of Asian elephant and tiger. This forest complex is one of the areas having the largest population of elephants and tigers in the wild. Despite the fact that the sanctury is very rich in biodiversity however no baseline data on any aspects of mammals was available for the BRT WLS till date. In light of the above it was dicided to carrying out a study entaiteled "Distribution and Abundance of large mammals in Biligiri Rangaswamy Temple Wildlife Sanctuary". During the present study we aimed to establish the distribution of large mammals in association with the forest types and assess the abundance of large mammals for the sanctuary.

Line transect method hes been used to estimate the density of large herbivore species, night surveys have been used to assess the status of nocturnal mammals, and plot work has been done to find the secondary signs of different species. We recorded all sightings of important species as incidental data. During the study period, abundance estimates of large herbivores were carried out and secondary data on large carnivore species was collected. We have used the sight records from all the methods to establish a distribution pattern of each species on vegetation map. Since the data from line transect was not enough to estimate densities at the level of forest range, the encounter rates were computed to compare between forest ranges and vegetation types. 33 transect lines with the lengths varying between 2 and 4 km were laid. Each transect was walked 5 to 11 times. Transects were walked early in the morning between 0600 hrs and 1000 hrs and in the evening between 1630 hrs and 1830 hrs. The study was carried out from October 2009 to April 2010. Following are some of the salient feature of the study.

- A total of 795.5 km of transect walk by single observer, 258 km of transect walk by multiple observers during day-time and 462 km of surveys during night-times were carried out in the sanctuary between October 2009 and April 2010.
- Among the 34 expected species of large mammals in the sanctuary 30 species were sighted and information on presence of one species was registered. Elusive animals like leopard cat, rusty spotted cat, slender loris, flying squirrel and chevrotain were sighted.
- Eleven sightings of rusty spotted cat in the sanctuary is a record of highest sightings of the species for a sanctuary anywhere in India. The majority of these sightings were in the drier forests at foot hills of the sanctuary.
- Slender loris, which is the state animal of Karnataka, was also sighted in two ranges. The present sighting of lorises in Punjur and Bylore forest ranges are the first sight records for the sanctuary. We confirm the sub-species found in the sanctuary as *Loris lydekkerianus lydekkerianus*, and the present sightings are westernmost sight record for the species in Karnataka.
- Hanuman langur, bonnet macaque, Indian giant squirrel and giant flying squirrel being arboreal mammals were found mostly in the moist deciduous and evergreen forests of the sanctuary.
- Leopard cat was largely found to be distributed in the moist deciduous and evergreen forests, while Asian palm civet, small Indian civet and porcupine show much wider distribution in the sanctuary. However muntjac and chevrotain were found to be distributed in the densely forests than the scrub forests.
- Large terrestrial herbivores including elephant, gaur, sambar, chital and wild pig were recorded in all the vegetation types. However the encounter rate varied highly between the vegetation types where-in gaur and sambar were encountered more in the

evergreen and moist deciduous forests while chital was encountered more in the dry forests.

- Four-horned antelope was recorded in the foot hills of all forest ranges wherever deciduous forests with open canopy and open scrub forests are present. In the present forest complex of the Deccan plateau, BRT shows the presence of large extent of suitable habitat and promising population of the species.
- Blackbuck is another antelope found in the sanctuary which is restricted to fringes of the sanctuary and is also known to raid crops in the periphery of the park.
- Tiger and sloth bears are found almost in all the beats or found in more than 90% of the sanctuary area, while leopards and dholes show patchy distribution. However to confirm the distribution pattern and habitat use by leopards and dholes, a long term data collection protocol is required.
- During the transect walk, we were able to obtain more than 40 detections for all the large herbivore species excepting the wild pig and four-horned antelope, to get a good density estimate. The data on detections (sightings, perpendicular distance, sighting angle and number of individuals) of each species were used to estimate the density using software program DISTANCE version-5.
- The estimated density (animals per km²) for large herbivore species was gaur: 5.08, sambar: 6.01, chital: 13.96, muntjac: 3.70, wild pig: 5.33, four-horned antelope: 2.44, Hanuman langur: 6.34 and bonnet macaque: 6.56. Estimates of large herbivore density in the present study, when compared with those from the other parks in the country, revealed that BRT Wildlife Sanctuary holds a high density of muntjac, medium density of sambar and gaur and low density of chital and Hanuman langur. Nevertheless the density of sambar was on par or higher than that in other parks of the same landscape. Though the gaur density in BRT was lower than that in Bandipur and Nagarahole, it shows a very promising density in the landscape.
- The density of large herbivore species when multiplied with the average weight of the respective species which gave density of biomass for each species. By addition of biomass of all the species total biomass density of 4127.82 kg km⁻² for the BRT Wildlife

Sanctuary was derived. Biomass density varies from as low as 1277.25 kg km^2 in Bhadra to 7638 kg km^2 in Nagarahole. Six parks in the country viz. Nagarahole, Ranthambore, Pench, Bandipur, Kaziranga and Kanha have a prey biomass density in excess of 4000 kg km² and the present study reveals that BRT Wildlife Sanctuary stands as one of the high biomass rich areas in the country.

- The overall herbivore density in BRT Wildlife Sanctuary was found to be lesser than many protected areas, however the density of large bodied species like gaur and sambar being very high has contributed to high biomass density. Since the density of biomass of large prey species is high in the sanctuary, the possibility of higher density of tiger is expected in comparison with other carnivore species.
- Asian elephant density was estimated to be 1.7 km⁻². Compared to the earlier vague estimate the present estimate with more robust method has yielded a reliable density-estimate. However an alarming fact is that the age-sex ratio of the individuals in the population is highly skewed with very few old bulls and less percentage of immature individuals.
- Further understanding on various aspects of mammals in the • sanctuary is highly essential. The present study found existence of good population of rusty spotted cat which requires detailed study on habitat selection, feeding ecology, population structure etc. Similarly four-horned antelope is a species needing more attention since their microhabitat is susceptible to fire and further suitable habitat availability for the species also needs to be studied. Elephants were poached for a long time in the region and the obvious impact of this is on their demography. The present study also confirms skewed age-sex ratios in the present population; however the data is only from a short period and hence making a final conclusion is difficult. Monitoring of elephant herds over a period for demography is crucial to understand the recovery of the population and its age-sex ratios. The availability of prey base and also sight records of tiger confirms the viability of the area for the conservation of tigers and other large predators in the sanctuary. However, proper estimation of predator populations especially tigers with appropriate methods and study of the ecology of large predators are very crucial. A dossier for each tiger would be very

helpful to understand the movement and conflict situations of each individual tiger, especially near the buffer region of the sanctuary.

• The present study has not only established the baseline data on large mammals, but has also added intrinsic value to sanctuary by divulging various aspects on large mammals and their conservation status. The present study confirms that the sanctuary is one of the potential sites for highly endangered tiger and hence further attention on conservation and understanding of the species is imperative.

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