Effect of Human Use, Season and Habitat on Ungulate Densities in Kanha Tiger Reserve

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Abstract : Density of large carnivores is primarily dictated by the density of their prey. Therefore, optimal management of ungulates populations permits harbouring of viable large carnivore populations within protected areas. Ungulate density is likely to respond to regimes of protection and vegetation types. This has generated the need among conservation practitioners to obtain strata specific seasonal species densities for habitat management. Kanha Tiger Reserve (KTR) of 2074 km2 area comprises of two distinct management strata: The core (940 km2), devoid of human settlements and buffer (1134 km2) which is a multiple use area. In general, four habitat strata, grassland, sal forest, bamboo-mixed forest and miscellaneous forest are present in the reserve. Stratified sampling approach was used to access a) impact of human use and b) effect of habitat and season on ungulate densities. Since 2013 to 2016, ungulates were surveyed in winter and summer of each year with an effort of 1200 km walk in 200 spatial transects distributed throughout Kanha Tiger Reserve. We used a single detection function for each species within each habitat stratum for each season for estimating species specific seasonal density, using program DISTANCE. Our key results state that the core area had 4.8 times higher wild ungulate biomass compared with the buffer zone, highlighting the importance of undisturbed area. Chital was found to be most abundant, having a density of 30.1(SE 4.34)/km2 and contributing 33% of the biomass with a habitat preference for grassland. Unlike other ungulates, Gaur being mega herbivore, showed a major seasonal shift in density from bamboo-mixed and sal forest in summer to miscellaneous forest in winter. Maximum diversity and ungulate biomass were supported by grassland followed by bamboo-mixed habitat. Our study stresses the importance of inviolate core areas for achieving high wild ungulate densities and for maintaining populations of endangered and rare species. Grasslands accounts for 9% of the core area of KTR maintained in arrested stage of succession, therefore enhancing this habitat would maintain ungulate diversity, density and cater to the needs of only surviving population of the endangered barasingha and grassland specialist the blackbuck. We show the relevance of different habitat types for differential seasonal use by ungulates and attempt to interpret this in the context of nutrition and cover needs by wild ungulates. Management for an optimal habitat mosaic that maintains ungulate diversity and maximizes ungulate biomass is recommended.
Keywords : distance sampling, habitat management, ungulate biomass, diversity

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