Conceptual Study of the Behavioural Changes of Mamalian Fauna Due to Ecotourism at Ecopark Hamirgarh, Bhilwara

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ARTICLE DETAILS

ABSTRACT

Ecotourism has great potential for negatively impacting animals as tourists seek out rare and spectacular species. Ecotourism-induced stresses on animals may result in changes in population densities, species composition, and community structure. This Ecopark is visited extensively by tourists. Potential impacts of tourism in Ecopark were evaluated by comparing the population densities of select species of mammals with and without tourist traffic (Elizabeth Boo, 1990). Densities and behavioral changes were estimated using visual line transects, distance sampling methods and water-hole method. Trends show the impact of ecotourism is species specific, with some species increasing in density, some decreasing, and others unaffected. An evaluation of the limitations and assumptions of the methods used provides a framework for consideration of the results (Ceballos-Lascurain, Hector, 1993). Given the potential negative impact of tourists on animals, national parks should develop management strategies to minimize these impacts, such as concentrating tourists in already disturbed areas.

INTRODUCTION

In recent years, ecotourism has been touted as a solution for conservation and development woes because of its ability to protect threatened biodiversity while providing economic growth for people living in and around protected areas (Wells and Brandon, 1992). The tourism industry has been growing rapidly along with an increasing interest in nature-based tourism or ecotourism. With a rapid increase in ecotourism, it is important to determine the impacts which are occurring despite the difficulty of quantifying these changes.

Animals in protected areas may face stress due to ecotourism. Nature tourism has great potential for negative impacts on animals, as tourists seek out rare or spectacular species—often during sensitive times, such as breeding or nesting (Knight and Cole, 1995). Previous studies have found that tourists cause negative impacts on the movement, foraging, and reproductive behavior of various kinds of mammals (Kae Kawanishi, 1995). Where human traffic is frequent, some species withdraw, some change behavior, and still others may become habituated to human presence (Van Schaik, personal communication 1995, Griffiths and Van Schaik, 1993). As animals become habituated to humans, they may use areas in which tourists are present as “escape valves” from predators, which avoid tourist destinations and human hunters.

Ecotourism’s impacts may result in abnormally high or low population densities of some species in tourist areas and can potentially lead to ecological change through population increases in the habituated or unaffected species, possibly altering the densities of their competitors or prey (Griffiths and Van Schaik, 1993).

These changes may have effects on the composition and functioning of the entire ecosystem. The Ecopark wildlife reserve at Hamirgarh where the study of Mammalian fauna, was carried out is situated in Hamirgarh village of Suwana tehsil of Bhilwara district in Rajasthan. It is situated at an altitude of 425 m above the sea level between 25°11’0” North & 74°38’0” East. It is spread in the 567 hectares and it was declared reserved forest by Govt. of Rajasthan on 21-06-2012. The Ecopark is home to various kinds of flora and fauna. One can observe and study a variety of wildlife (fauna) like Indian fox (Vulpes bengalensis), Golden jackal (Canis aureus), Nilgai (Boselaphus tragocamelus), Chinkara (Gazella bennetti), Grey monkey or Hanuman langur (Semnopithecus) and many more. The configuration of land at Ecopark and Hamirgarh village where this park is situated includes mountains, hills, flat areas, small riverlets, nallas and valleys of different depths. The forest at this wildlife park constitutes of many types of hybrid species like salon, gurjan, dhavda, khair, tendu patta, kohala, dhak, kherni and various types of wild grass.

The temperature as in the state of Rajasthan itself remains high in summer and very low in winter. Winter is from December to February and summer is from March to
June. The monsoon is from July to September every year. The state of Rajasthan though being a dry state with less rainfall generally but the village of Hamirgarh and Ecopark sanctuary gets more than average rainfall due to its forest vegetation. There are few small rivers and rivelets flowing through the reserve and the soil has good enough water. This Ecopark wild reserves comes under Bhilwara forest range. The Eco park is so designed (566.15 hectare area) that these mammals can be visualised easily. Various walking paths are constructed like Jackal path for observing Jackal, Chinkara path for chinkara and many more.

The goal of this project is to compare animal population densities and the behavioral changes in two different regions of Eco-Park to identify variations which may possibly be explained by tourism pressures (Klein et al. 1995). Population densities of select species were estimated for two areas of the park: 1) an area frequented by tourists and 2) a little disturbed tract of forest less visited by tourists.

METHODS

Line transect surveys were conducted during the morning and evening by slowly walking along the transects (a given direction and distance) and recording animal sightings (Buckland et al. 1993, Burnham et al. 1980, Emmons, 1984). A guide was present during observation in the control areas.

The following was recorded for each sample: length and location of transect, weather conditions, time of day, and number of tourists encountered. For each sighting the following was recorded: species; radial distance (r) from the observer to the animal, measured with a range-finder to the nearest meter; sighting angle (θ), measured with a compass to the nearest two degrees; and animal behavior. The perpendicular distance (x) from the animal to the transect was then calculated as: x = r(sinθ). The horizontal distance from the observer to the base of the tree was measured and recorded as r when animals were found in trees. When animals were observed in groups, the distance and angle to the nearest member of the group was measured and the number of individuals in the group was recorded.

EVALUATION OF METHODS

Distance sampling theory expands finite population sampling methods adjusting for the fact that some, possibly many, of the animals are undetected (Buckland et al. 1993). This method can be appropriate when the size of the sample area is unknown and objects are not detected for several reasons.

The number of animals observed is an estimate of the true density and the probability of detection. The probability of detection is a function of many factors including cue production, observer effectiveness, and the environment (Buckland et al. 1993). Distance sampling provides a broad method for estimating population density. While the total count of observed animals can vary for reasons unrelated to density, using distances allows for meaningful estimates of density even with variability in detection caused by these factors (Buckland et al. 1993).
IMPACTS OF ECOTOURISM:

Ecotourism, as studied, was found to have negative effects on various behavioural traits, and ultimately on populations of wild animals at the ecopark.

Alert & Alarm behaviour

The very indications of wildlife getting disturbed by eco-tourists were the alarming behavioural changes. The herbivores chinkara and nilgai on the approach of tourist, would leave their present activity instantly, their ears would get erect, as if trying to listen, would stand if sitting and get ready to run and look fixedly at the tourist, changes in the vocalization would start taking place, some increasing calls, some would decrease their sound. The jackal and even fox, we observed, would stop its activity, when exposed to tourist suddenly.

Avoidance behaviour

Perhaps the most easily noticeable reaction to human (tourist) disturbance observed was to shift away, hide and to run. It may start by tourists approaching towards them on vehicles or may be on foot even. Some animals avoided areas such as the walking tracks and trails once the tourists gets into site. Fox would avoid humans by leaving the area, or avoiding the trails likely to be used by visitors or totally hide behind the thick grown grasses bushes (Kumpumula, 1979). At times, few species, on the contrary, sometimes got habituated very easily by tourist responding to them when approached as the occasional behaviour shown by chinkara. Others would try not to adjust to the changes and were observed rather, changing their activity timings.

Aggressive response

When these wild animals were fed by tourist from far and near, aggressive behaviour from animals were observed a few many a times. There were reports of golden jackal attacking villagers at times. Nilgai, would make gushing sounds and were observed acting defensively when approached near for feeding them by the tourist, being very sensitive. Wild boar, would screech, grunt and make aggressive movements on approach of tourist.

Food and water

On provision of food or water, scrap food and leftover etc by tourist, the behaviour of wild animals were noticed to be changing. A sheer possibility of changing their food habit by wild animals was noticed at the ecopark, as they were seen eating the trash in the form of left out eatables on a regular basis at the temple site (David Western, 1986). There were some mortality too because of the garbage collected around the temple as reported by the priest of the temple.

Increase in road kill

Wildlife tourism or ecotourism does have the potential to increase road kills too. Tourist bring heavy traffic to a wildlife-rich area habituating animals to traffic and thus making them less wary on roads, and also, the vehicles of tourist creates a kind of attraction to animals and then accidently get killed by them eventually. There were many reports of such kind. This was observed to increase during the times of festivals, when there would be more tourist at the ecopark.

Impact on wildlife population

The observations of number of tourist at different times in different seasons showed the number of animals also varied differently. It was observed that when the tourist presence was more on Sunday because of the holiday and religious purpose at the temple in the ecopark, the number of animals visible would reduce considerably in both the seasons, and were found to increase on Wednesday when there would be no visitors on the ecopark, as it would be closed. The numbers kept fluctuating on a regular basis.
Population variation of mammals (with tourist) and (without tourist)

The population of golden jackal grew from 154 to 159 whereas, Indian fox numbers escalated to 19 from 14. The reason may be, that these animals were observed getting used to trash cans and garbage dumps and have become habituated to the humans in and around the temple area. This behaviour could account for their increased numbers at the ecopark (Muther & Lucy, 1992). The population of striped hyena remained almost unaffected during this period, as if it had no impact of anything whatsoever. The population of wild boar have come down from 38 to 35, probably by vehicular accidents by the tourist’s vehicles. As for porcupine, its population in both the seasons remained stable. Nilgai grew in number from 215 to 231 during this study period, because this animal were seen mostly in groups in far corners of the study site, where very few tourist would venture.

During the study, we observed chinkara or the Indian gazelle (Gazella bennetti), decreased from 77 to 66 in count, as this species is a small tiny and shy animal, which could not adjust itself to the increasing and over anxious tourist population. There were few mortalities of chinkara, and nilgai fawns getting killed by the disturbing tourist as reported by the forest staff and the villagers. Furthermore, there was a shift and variations in population of mammals seen at the ecopark, when there were more number of visitors and when there were very few or no tourists at all. It has culminated in very high fluctuations in densities of some species which would lead to changes in ecological patterns.

CONCLUSIONS

Because of this reason, long term consequences on composition, floristic make-up and functioning of the ecosystem can be felt and observed. We could conclude therefore, that ecotourism has great potential for negative impacts on movements, foraging and reproductive behaviour of mammals. So, proper management strategies to minimize the impacts of tourists should be developed for this ecopark, and its wildlife in general.

Visual survey and distance sampling methods may confound results. The increased presence of some species may be an artifact of their habituation to humans and may have increased the likelihood of their being observed. Because of the effect of the observer’s presence and limitations of using transect surveys, non-invasive methods such as infrared tripped cameras could provide a better estimate of animal densities and thus tourist impact.

However, trends do show that the effect of tourists on animal densities appears to be species specific. Some populations increase in areas with tourist activity, some decrease, and some show no apparent difference. Habituation of animals in the ruins due to human presence and a probable decrease in predation pressure on these animals are likely causes of their increased densities. This in turn may have secondary effects on the species composition of the ecosystem, including the flora, due to changes in distributions of herbivores and of seed dispersers.

So reserved areas such as this Ecopark, which is attracting increasing numbers of tourists interested in going “off the beaten path” should develop management strategies to minimize the impacts of tourists on animal populations. This demonstrates the need for more comprehensive and long-term research on the issue, as well as the investigation of other sites experiencing tourist pressure. Research is also needed to determine what levels and rates of tourist traffic trigger negative impacts on wildlife. This will enable park managers to set levels that will minimize the impacts on the biodiversity the parks are established to protect.

REFERENCES


