

## IMPACT OF TOURISM ON DISTRIBUTION PATTERN OF RHESUS MONKEY (*MACACA MULATTA*) IN GALLIYAT ABBOTTABAD, PAKISTAN

Ehtisham<sup>1</sup>, Rizwan ur Rehman<sup>1</sup>, Raja Wajahat<sup>1</sup>, Tabarak Ashraf<sup>1</sup>,  
Shabir Ahmad Jan<sup>1</sup>, Arz Muhammad<sup>1</sup> and Ahmad Zamir<sup>2\*</sup>

### ABSTRACT

Rhesus monkeys is one of the species of primates having the large geographic range extend from northern Africa to south and Southeast Asia, southern China and northeast to Japan. Their tendency to survive under diverse environmental conditions make their survival in numerous habitats. Association between primates and the tourism are commonly studied, but the differences occur among the goal of ecotourism and their damaging effects that has become a reason of concern these days. Present study was designed to assess effect of tourism on the distribution of rhesus monkey in Galiyat region of Khyber Pakhtunkhwa province of Pakistan. To achieve these study goals surveys were conducted in various parts of Galiyat during June to September 2022. Data was collected both for population of monkeys by visual encounter method and interaction with tourists while interview responses were obtained by developing questionnaires. On the basis of encounter rates and population estimates, nine major interacting sites were identified in Galiyat region, viz. Nathia Gali, Morti, Khoza Gali, Kala Bagh, Charian, Changla Gali (Monkey View Point), Changla Gali (Kashmir View Point), Bara Gali and Ayubia. Population at each interacting spot was different, highest population existed at Nathia Gali interacting spot. The present research describes 113 groups of *Macaca mulata* with a total of 3685 macaques in different parts of Galiyat region. All over their distributional range in India, these monkeys reside in the vicinity of the human settlements and obtain their food from humans, either directly from humans or by damaging human agricultural resources and this has developed an unavoidable conflict and competition both for food resources and shelter.

**Keywords:** Rhesus monkey, Impact, tourism, Ayubia National Park.

### INTRODUCTION

Genus *Macaca* belongs to the Cercopithecine (old world monkeys), and they are more diversely found almost in twenty Asian countries extended over an area of fifty hundred thousand kilometer squares (Eudey, 1987). Macaques are famous between primatologists due to their bold natures (Thierry *et al.*, 2004). Rhesus macaques (*Macaca mulatta*) is the most common species of old world monkeys that exists in their natural habitat in the Afghanistan, Pakistan, India, Southeast Asia, and China and is categorize as least concern in the IUCN red

---

<sup>1</sup> Wildlife Department Khyber Pakhtunkhwa, Pakistan

<sup>2</sup> Pakistan Forest Institute, Peshawar Pakistan

\* Correspondence author's email: [zamir\\_usafzai@yahoo.com](mailto:zamir_usafzai@yahoo.com)

list of threatened species (Timmins *et al.*, 2008). Troops of rhesus monkey live in different habitat including grasslands, arid and forested areas, but in some cases, they also inhabit near to human residence (Kumar *et al.*, 2013). Their ability to adapt diverse environmental situations allow them to thrive in numerous habitats (Aderson *et al.*, 2017).

Among most part of the world many primate specie lives in the transitional habitats where anthropogenic activity affects the ecology and behavior of non-human primate (Strier, 2018). In Asia, macaques closely interact with humans at tourist attraction sites, recreation site, natural parks and temples (Zhao, 2005). At religious and tourist sites, macaques are habitual to humans and expecting food from visitors and thus closely interact with them (Burton, 2002).

## REVIEW OF LITERATURE

Populations of human beings are increasing day by day thus increasing in land use change and wildlife populations are adapting themselves to live in human dominated area or vanish (Schulz and Skonhoft, 1996). In some areas, primates heavily depend upon humans for their survival (Strum, 1994). Dependence on tourists for food is a negative monkey-tourist relation (Zhao and Deng, 1992). The interaction spots where tourists provide food to macaques result in emergence of management challenges (Sinha and Mukhopadhyay, 2013). Changes in physiology and behavior have been observed in free ranging animals that are exposed to humans (Fowler, 1999). A negative interaction develops between humans and macaques in those areas where food is provided by humans and has become a challenge for survival of species (Southwick *et al.*, 1998).

Majority of tourists are unaware about their negative impact on the behavior of wildlife (Grossberg *et al.*, 2003), and the most of human-primate connections are started by tourists (McCarthy *et al.*, 2009). This makes a tricky ethical situation for primatologists, who identify the challenges involved in the balancing of economic requirements of the regions that are used for the betterment of wildlife (Lee, 2010).

Chauhan and Pirta (2010) find out the agnostic interactions between monkeys and humans. Agnostic interaction among humans and monkeys raised due to space and food that led to the rise of conflicts between monkeys and humans. They also reported no sever attacks by monkeys on humans rather dependence upon humans for food was a matter of concern.

The objectives of present research are to study the key area of Galliyat where tourism activity promotes interaction with Rhesus monkey, to estimate the population status of monkeys on selected tourist sites, to study the interacting tourist spots for assessment of threats to Rhesus monkey populations and to

understand the effects of Rhesus monkey populations upon tourism activities.

## MATERIAL AND METHOD

### Study area

This study was carry out in Ayubia national park-Galliat region, which lies in the Galliat forest, Abbottabad, Khyber Pakhtunkhwa. The park located between 34°00'48"-34°06'23" N latitude and 73°22'54"- 73°27'15" E longitude in the forest of Galiyat. Initially, the total area of the national park was 1684 hectares but it is extended in to 3322 hectares in 1998. The area of the park spreads over 33 km<sup>2</sup>; while reserved forests have an area of 150 Km<sup>2</sup> (Farooque, 2007). The Ayubia National Park having an altitudinal variation ranging from 1050m to 3027m. The main area of the park contains the most temperate forest type and it also includes sub alpine meadows (Merranjani and Mukshpuri) and sub-tropical forest (Lahur Kas village) (Aumeeruddy *et al.*, 2004; Farooq, 2007).

### THE FLORA AND FAUNA

The study area has rich natural biodiversity including birds, mammals and other biodiversity. In Ayubia national park there are 410 species of combined vegetation belonging to phylum Fungi, Lichens, pteridophytes (Shafique, 2003) and 200 herb species are reported (Shinwari, 2010), while most of them are of medicinal and having economic importance. The *Abiespindrow* Royle, *Cedrus deodara* (Roxbex lamb) are dominant plant species of Ayubia national park (Shafique, 2003). The flora of Ayubia National Park includes Blue pine (*Pinus wallichiana*), Silver fir (*Abies pindrow*) , Himalayan Spruce (*Picea smithiana*), Yew (*Taxus wallichiana*), Holly Oak( *Quercus ilex*), Hack berry (*Celtis occidentalis*), Deodar(*Cedrus deodara*), Persian walnut (*Juglans regia*), Horse chestnut, (*Aesculus indica*) Indian maple (*Acer oblongum*), Petc (Farooque, 2007).

Park have rich population of mammals and bird's species Such as Common leopard (*Panthera pardus*), Rhesus monkey (*Macaca mulatta*), Giant Indian Flying Squirrel (*Petaurista philippensis*), Small Kashmir Flying Squirrel (*Eoglaucomys fimbriatus*), Yellow-throated Marten( *Martes flavigula*), Murree Vole ( *Hyperacrius wyneei* ), Wild boar (*Sus scrofa*), Indian Crested porcupine ((*Hystrix indica*), Golden eagle (*Aquila chrysaetos*), Koklass pheasant (Pucrasia macrolopha), Kalij pheasant (*Lophura leucomelanos*), Masked Palm Civet (*Paguma larvata*) (Farooque, 2002).

### SOCIAL ASPECT

Ayubia national park located in Galiat, surrounded by local communities that depends on park resources for their livelihood. The human population in the

area was 50,000 peoples, living in 8,333 households, and the average family size was six in the periphery of the park (Adnan *et al.*, 2005) and the rate of population growth was 3% annually (Khanum and Gilani, 2005). The park periphery includes three small towns (Nathiagali, Khanspur and Ayubia) and eight communities (Aumeeruddy-Thomas *et al.*, 2004; Farooque, 2007).

Tourism was also an important tool for promoting sustainable livelihoods in Ayubia national park (Blangy and Mehta, 2006). Approximately 90,000-100,000 tourists visit each year to Ayubia national park (Aumeeruddy-Thomas, 2004). Tourists were facilitated in vacant homes, hotels and restaurants which was an important source of income for the local community (Blangy and Mehta, 2006). Hotels in Nathiagali and Ayubia also provide an important way of livelihood in the park area.

## METHODS

This study was initiated during June 2022 and completed in September 2022. During the first phase of the study data was collected regarding the existence of different groups of monkeys and their population distribution along with estimation of mean population around various selected spots. During the second phase of the study, responses of the local community and their attitudes related to co-existence of monkey populations were recorded.

### Survey of *Rhesus macaque* populations in Galiyat region

In the starting phase of the study, selection of particular spots of rhesus monkey's population estimation in different localities of the study area were carried out. Surveys were conducted along the linkage roads connected different parts of Galiyat and their associated towns. These surveys were conducted in motor car with an average speed of 15-20 kilometer per hour. Motor car was halted during monkey group search whenever a different group was identified. Monkey groups were identified with the help of local people, wildlife watchers and tourists adjacent to the connecting roads. The confirmation of existence of monkey groups was done by revisiting the locality during dawn and dusk.

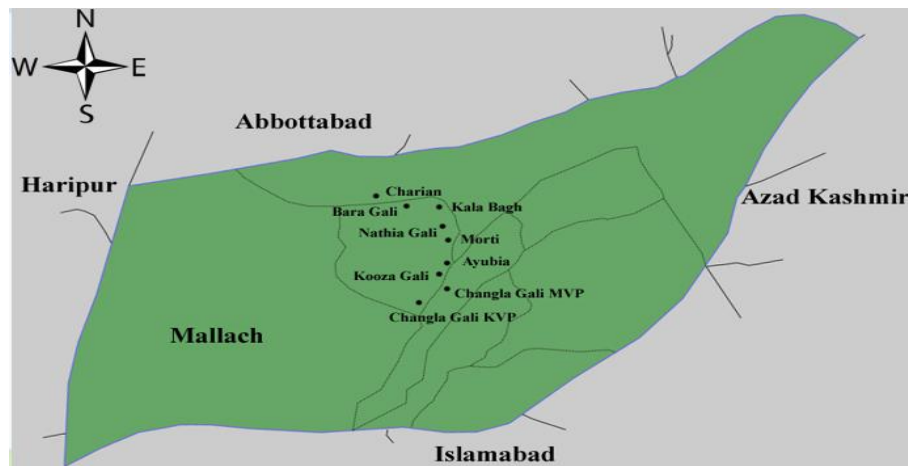
During the study, all visual encounters between monkeys and tourists were categorized and recorded on Performa. Activity of the animal, time spent with the tourists and estimated average distance with the tourists was also recorded.

On confirmation of monkey groups, visual encounters with each and every group were developed with a standard distance of 10 meters. Interaction between tourists and rhesus macaques were recorded. An observation was noted down when a monkey was visually encountered. An encounter was described as when humans positioned themselves to take attention of monkey or

travelled towards the direction of monkey. GPS coordinates of different encountering sites were collected with the help of Garmin GPS receiver whereas population count was assisted by Olympus binocular (20×50). To estimate the population, present in each group of macaques, they were frequently given food of their choice including corns and bananas. To avoid recounting of various monkey groups and their group members they were marked with individual identities including coat colour differences, number of infants in a group and associated female numbers in a particular group. All these surveys were performed twice in a month by visiting different selected interaction spots, viz. Ayubia, Bara Gali, Changla Gali (KVP), Changla Gali (MVP), Charian, Kala Bagh, Khoza Gali, Morti and Nathia Gali.

### Local community response survey

After the development of questionnaire, different parts of the study areas were randomly selected for the questionnaire based survey from local residents in various towns. Questionnaires were also filled against responses of tourists, randomly from different types of tourists visiting in Galiyat region and their behaviours towards primates. Responses were collected from 24 different sites, viz. Ayubia, Bara Gali, Bara Than, Darwaza, Dunga Gali, Kahu Gharbi, Kala Bagh, Khanspur, Khun Kalan, Kuza Gali, Lungal, Mallach, Maira Khurd, Mohra, Morti, Nagri Bala, Namli Maira, Nathia Gali, Pipeline Track, Riala, Tajwal, Thrati, Touheed Abad and Ziarat. Respondents at each site were selected randomly and belonged to different occupations, viz. shopkeepers, government servants, farmers, housewives, private workers, teachers, businesspersons, drivers, carpenters and students. Both genders between the ages of 20-72 years were engaged to collected responses regarding macaques in the study area. A total of 200 questionnaires were filled during the present research work in Galiyat region.



Map showing nine interaction spots in study area of Galiyat region, KP. Pakistan.

Table 1. GPS coordinates along with elevation levels of various rhesus macaque interaction spots in Galiyat region of Khyber Pakhtunkhwa province of Pakistan.

Interaction spot	Latitude (DMS)	Longitude (DMS)	Elevation (m)
Ayubia	34° 02' 90. 1" N	073° 40' 34. 7" E	2398
Bara Gali	34° 08' 64. 1" N	073° 35' 25. 6" E	2192
Changla Gali (KVP)*	34° 00' 40. 9" N	073° 38' 72. 4" E	2513
Changla Gali (MVP)**	34° 00' 88. 5" N	073° 38' 71. 3" E	2487
Charian	34° 09' 38. 1" N	073° 35' 64. 2" E	2109
Kala Bagh	34° 07' 43. 9" N	073° 37' 19. 5" E	2410
Khoza Gali	34° 01' 35. 2" N	073° 38' 99. 3" E	2449
Morti	34° 05' 01. 9" N	073° 39' 60. 3" E	2306
Nathia Gali	34° 06' 75. 5" N	073° 39' 40. 3" E	2410

\*Kashmir View Point

\*\*Monkey View Point

## RESULTS AND DISCUSSION

On the basis of encounter nine major interacting sites were identified in Galiyat region, viz. Nathia Gali, Morti, Khoza Gali, Kala Bagh, Charian, Changla Gali (Monkey View Point), Changla Gali (Kashmir View Point), Bara Gali and Ayubia. Highest encounters were seen at Nathia Gali followed by Changla Gali (MVP) and then Ayubia. Macaques were least encountered at Charian.

### Ayubia interaction spot

At this interaction spot, total of 384 individuals were observed. Twenty-one groups were noted having a population size range of 18-146 individuals.

### Bara Gali interaction spot

At this interaction spot, 241 individuals were observed. Highest number of macaques were seen in dense pine forest landscapes. Fifteen groups were noted having a population size range of 14-109.

### Changla Gali (Kashmir view point) interaction spot

At this interaction spot 643 individuals were observed. Highest number of macaques were seen in dense pine forest landscapes. Eleven groups were noted having a population size range of 24-143.

### Changla Gali (monkey view point) interaction spot

At this interaction spot, about 752 individuals were observed. Highest

number of macaques were seen in dense pine forested ranges. Twenty-four groups were noted having a population size range of 21-150.

#### **Charian interaction spot**

At this interaction spot A total of 140 individuals were observed. Only six groups were noted having a population size range of 32-40 individuals.

#### **Kala Bagh interaction spot**

At this interaction spot, *Macaca mulata* were recorded in different villages. A total of 168 individuals were observed. Highest number of macaques were seen in dense pine forest landscapes. Fourteen groups were noted having a population size range of 18-115 individuals.

#### **Khoza Gali interaction spot**

At this interaction spot, rhesus macaques were recorded in various places. A total of 341 individuals were observed. Highest number of macaques were seen in dense pine forested ranges. Six groups were noted having a population size range of 40-65 individuals.

#### **Morti interaction spot**

At this interaction spot, about 204 individuals were observed. Highest number of macaques were seen in dense pine forest landscapes. Only four groups were noted having a population size range of 16-70 individuals.

#### **Nathia Gali interaction spot**

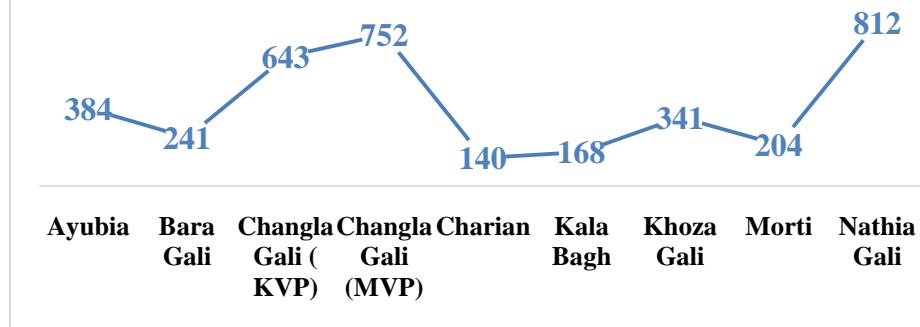
At this interaction spot, *Macaca mulata* were recorded in different villages. A total of 812 individuals were observed. Highest number of macaques were seen in dense pine forest landscapes. Sixteen groups were noted having a population size range of 18-125 individuals.

Table 2. Number of groups of rhesus monkeys, range of their population sizes at nine interaction spots of Galiyat region, KPK, Pakistan.

Interaction Sites	No of Groups Identified	Population Size Range
Ayubia	21	18-146
Bara Gali	15	14-109
Changla Gali ( KVP)	11	24-143
Changla Gali (MVP)	24	21-150

Charian	6	32-40
Kala Bagh	14	18-115
Khoza Gali	6	40-65
Morti	4	16-70
Nathia Gali	16	18-125

### POPULATION OF RHESUS MONKEYS



Population of rhesus monkeys at nine interaction spots in Galiyat region of Khyber Pakhtunkhwa, Pakistan

### Response of local community towards monkeys

Two hundred responses were collected on specifically designed questionnaire from 24 different localities, viz. Tajwaal ( $n = 21$ ), Khoza Gali ( $n = 09$ ), Toheed Abad ( $n = 23$ ), Ayubia ( $n = 01$ ), Pipeline Track ( $n = 19$ ), Mourti ( $n = 16$ ), Donga Gali ( $n = 05$ ), Nathia Gali ( $n = 18$ ), Khanispur ( $n = 08$ ), Bara Gali ( $n = 03$ ), Kala Bagh ( $n = 06$ ), Mouhra ( $n = 15$ ), Meira Khurd ( $n = 12$ ), Kauhu Gharbi ( $n = 07$ ), Namli Mera ( $n = 14$ ), Mallach ( $n = 13$ ) and Khun Kalan ( $n = 10$ ).

Out of 200 opinions, most of the people were agree that Galiyat regions have popularity as tourist resort (98.5 %,  $n = 197$ ). Majority of respondents favored that summer season show highest density of tourists in this region (97.5 %,  $n = 195$ ). Rhesus monkeys have been seen frequently around residential points, stated by 79 % respondents ( $n = 158$ ). Prominent proportion of respondents were in favor of the daily visits of rhesus macaques around their residential spots (73 %,  $n = 146$ ). On average highest responses showed that people can discriminate between both sexes of rhesus monkeys (82 %,  $n = 164$ ). A high proportion of responses favoured that macaques visit populated areas during summer season (92 %,  $n = 184$ ) whereas during winter season their population declined to the minimum level (91 %,  $n = 182$ ). Forests present in



nearby areas of residential sites are the key areas that support most of the population of monkeys (80 %,  $n = 160$ ) and these forest were found greater than 100 meters of distance from residential sites (85.5 %,  $n = 171$ ). Most people were in favour of the opinion that monkeys always come in groups (96.5 %,  $n = 193$ ). Majority of the people were believed that monkeys come into the villages in the form of groups that consist of 30 individuals that is led by more than two males. After entering into the village, monkeys favour to damage crops than other activities (50.5 %,  $n = 101$ ) and morning time is favourable for these sort of destructive activities (73 %,  $n = 146$ ). Attacks on humans were also reported by most of the respondents (96.5 %,  $n = 193$ ). Hitting monkeys with stones was the most disturbing situation for monkeys (85.5 %,  $n = 171$ ). High invasion rate of monkeys in local villages might be due to enough availability of food (92.5 %,  $n = 185$ ). But in spite of all the destructive abilities, local people also like to have them in their vicinity (80 %,  $n = 160$ ) due to the attraction of tourists towards monkeys (79.5 %,  $n = 159$ ) as they like to have fun with them (84 %,  $n = 168$ ). As for as the increase in population of rhesus monkeys is concerned, majority of the locals support the idea that their population is increasing day by day (77.5 %,  $n = 155$ ). Monkeys like tourists because they give them natural food stuff, viz. fruits and vegetables (85.5 %,  $n = 171$ ) and this food is good for their health (80.5 %,  $n = 161$ ). Most responses showed that tourists never try to catch monkeys (66.5 %,  $n = 133$ ) so their populations are not under threat (86 %,  $n = 172$ ). In this way tourism has a positive impact on monkey populations (86.5 %,  $n = 173$ ). Despite these positive impacts their population must be conserved by urgent measures (61.5 %,  $n = 123$ ). High proportion of respondents believe that there is a human-primate conflict in their community (92.5 %,  $n = 185$ ) and this is due to their crop raiding activities (84 %,  $n = 168$ ). The most common way to prevent monkeys from crop damage is to hit them with stones (61 %,  $n = 122$ ). Due to various human anthropogenic activities monkeys have become more fearless and aggressive (24.5 %,  $n = 49$ ).

During past few decades, the population of rhesus macaque (*Macaca mulata*) has been distributed spatially in many parts of the study area this is probably because of trapping of monkeys for commercial purposes and deforestation (Serio-Silva *et al.*, 2015). Since previous studies have not been done regarding populations of this monkey so comparisons cannot be made. They only way to find out the population trend is local opinion. According to local people population showed an increasing trend this is due rapid growth rates both in monkey populations and groups because of high birth rates and predator free environments. Imam *et al.* (2001) supported this idea due to calculation performed for natality and mortality rates of rhesus monkeys. The present research describes a total of 113 groups of *Macaca mulata* with a total of 3685 macaques in different parts of Galiyat region.

Alterations in monkey behaviors might be due to increasing human population pressure and their associated problems. During present study it was

observed that corn sellers have been increased at tourist spots and these corn sellers provide food to monkeys during summer season. Due to these practice macaques have been found more dependent upon these corn sellers and their ability to forage independently has been restricted. Furthermore, these corn sellers have made some hot spots along with monkey groups and the distribution of monkeys have been restricted to these hot spots only. This provisioning of food has played negative impacts on non-human primates and helped to develop more aggressive behaviours (Kaburu *et al.*, 2019). All over their distributional range in India, these monkeys reside in the vicinity of the human settlements and obtain around 93 % of their food from humans, either directly from humans or by damaging human agricultural resources and this has developed an unavoidable conflict and competition both for food resources and shelter (Sengupta and Radhakrishna, 2018). During present study, it was also observed that during winter season less food was available that led the monkey to attack on houses and aggressively obtained food material to fulfill their demands. Due to this easy access to available food, monkeys have developed aggressive and snatching behaviours in Galiyat region. Another wrong practice was observed during present study that tourists and other professional monkey trainers trap infants of monkeys to sold in various local markets of the country (Wong, 2019).

## CONCLUSION AND RECOMMENDATIONS

This study reflect that the population of macaques is surviving even though increased anthropogenic activities. This happened due to the high birth and growth rates in monkey populations and because of predator free habitats. A rapid and abrupt increase in these non-human primate populations may harm human primates. Extensive damage to the resources and even attack on humans make these creatures a threat for humans and promotes conflict. Although monkeys attract tourists in various places of the globe but an increasing, interaction with humans is promoting negative aggressive behaviors in these macaques. These negative damaging impacts of rhesus populations are ultimately promoting human beings to persecute monkeys in their wild areas. So this is recommended that government and non-government organizations should play their role to actively participate in management of tourist hot spots. Wildlife officials should be trained enough to monitor tourists carefully what they are feeding to these interacting macaques. Local should be trained and equipped to deal with handling of monkeys.

## REFERENCES

- Adnan, S.M., Ahmad, H., Afza, R., Hussain, S.K. and Waseem, M., 2005. Introduction of offseason vegetables for improved livelihood and conservation of plant resources in Galliat. In *Conservation linked to livelihood opportunities—case studies: Proceedings of the national workshop (February 22-24, 2005)*. Prepared by WWF-Pakistan under People and Plants Project.
- Aumeeruddy-Thomas, Y., Shinwari, Z.K., Abdullah, A. and Khan, A.A., 2004. Ethnobotany and the management of fodder and fuelwood at Ayubia National Park, North West Frontier Province, Pakistan. People and Plants working paper, (13).
- Anderson, C.J., Heard, D.J., Andreu, M.A., Hostetler, M.E. and Johnson, S.A., 2017. Winter Home Range and Habitat Selection of a Rhesus Macaque Group (*Macaca mulatta*) at Silver Springs State Park. *Florida Scientist*, 80(4), pp.159-164.
- Blangy, S. and Mehta, H., 2006. Ecotourism and ecological restoration. *Journal for Nature Conservation*, 14(3-4), pp.233-236.
- Burton, F.D., 2002. Monkey King in China: basis for a conservation policy?. *Cambridge Studies in Biological and Evolutionary Anthropology*, pp.137-162.
- Chauhan, A. and Pirta, R.S., 2010. Agonistic interactions between humans and two species of monkeys (rhesus monkey *Macaca mulatta* and hanuman langur *Semnopithecus entellus*) in Shimla, Himachal Pradesh. *Journal of Psychology*, 1(1), pp.9-14.
- Eudey, A.A., 1987. Action plan for Asian primate conservation: 1987-1991. *Riverside: UNEP, IUCN, WWF*.
- Farooque, M., 2007. Management Plan of Ayubia National Park. *Khyber Pakhtunkhwa Wildlife Department, Peshawar*, pp.18-20.
- Fowler, G.S., 1999. Behavioral and hormonal responses of Magellanic penguins (*Spheniscus magellanicus*) to tourism and nest site visitation. *Biological Conservation*, 90(2), pp.143-149.
- Grossberg, R., Treves, A. and Naughton-Treves, L., 2003. The incidental ecotourist: measuring visitor impacts on endangered howler monkeys at a Belizean archaeological site. *Environmental Conservation*, 30(1), pp.40-51.

Imam, E., Malik, I. and Yahya, H.S.A., 2001. Translocation of rhesus macaques from airforce station, Gurgaon (Haryana) to the natural forest of Firozpur-Jhirka, Haryana, India. *Journal-bombay natural history society*, 98(3), pp.355-359.

Kaburu, S.S., Beisner, B., Balasubramaniam, K.N., Marty, P.R., Bliss-Moreau, E., Mohan, L., Rattan, S.K., Arlet, M.E., Atwill, E.R. and McCowan, B., 2019. Interactions with humans impose time constraints on urban-dwelling rhesus macaques (*Macaca mulatta*). *Behaviour*, 1(aop), pp.1-28.

Khan, U., 2015. *Ecology, socioeconomic implications and habitat change of the common leopard (Panthera pardus) in the Western Himalayan Ecoregion, Pakistan*.

Kumar, R., Sinha, A. and Radhakrishna, S., 2013. Comparative demography of two commensal macaques in India: implications for population status and conservation. *Folia Primatologica*, 84(6), pp.384-393.

Lee, P.C., 2010. Sharing space: can ethnoprimateology contribute to the survival of nonhuman primates in human-dominated globalized landscapes?. *American Journal of Primatology*, 72(10), pp.925-931.

McCarthy, M.S., Matheson, M.D., Lester, J.D., Sheeran, L.K., Li, J.H. and Wagner, R.S., 2009. Sequences of Tibetan macaque (*Macaca thibetana*) and tourist behaviors at Mt. Huangshan, China. *Primate conservation*, 24(1), pp.145-152.

Schulz, C.E. and Skonhott, A., 1996. Wildlife management, land-use and conflicts. *Environment and Development Economics*, 1(3), pp.265-280.

Serio-Silva, J.C., Olguín, E.J., Garcia-Feria, L., Tapia-Fierro, K. and Chapman, C.A., 2015. Cascading impacts of anthropogenically driven habitat loss: deforestation, flooding, and possible lead poisoning in howler monkeys (*Alouatta pigra*). *Primates*, 56(1), pp.29-35.

Sengupta, A. and Radhakrishna, S., 2018. The hand that feeds the monkey: mutual influence of humans and rhesus macaques (*Macaca mulatta*) in the context of provisioning. *International Journal of Primatology*, 39(5), pp.817-830.

Sinha, A. and Mukhopadhyay, K., 2013. The monkey in the town's commons, revisited: An anthropogenic history of the Indian bonnet macaque. In *The macaque connection* (pp. 187-208). Springer, New York, NY.

Shafique, M.C., 2003. *Some aspects of bioecology of Ayubia National Park* (Doctoral dissertation, PhD Thesis. University of Karachi).

Southwick, C.H., Malik, I. and Siddiqi, M.F., 1998. Translocations of rhesus monkeys in India: prospects and outcomes. *American Journal of Primatology*, 45(2), pp.209-210.

Strier, K.B., 2018. Primate social behavior. *American journal of physical anthropology*, 165(4), pp.801-812.

Strum, S.C., 1994. Prospects for management of primate pests. *Revue d'écologie*.

Thierry, B., Singh, M. and Kaumanns, W. eds., 2004. *Macaque societies: a model for the study of social organization* (Vol. 41). Cambridge University Press.

Timmins, R.J., Richardson, M., Chhangani, A. and Yongcheng, L., 2008. *Macaca mulatta*. IUCN 2012. IUCN Red List of Threatened Species. Version 2012.1.

Wong, R.W., 2019. The Illegal Wildlife Trade. In *The Illegal Wildlife Trade in China* (pp. 39-62). Palgrave Macmillan, Cham.

Zhao, Q.K. and Deng, Z.Y., 1992. Dramatic consequences of food handouts to *Macaca thibetana* at Mount Emei, China. *Folia Primatologica*, 58(1), pp.24-31.

Zhao, Q.K., 2005. Tibetan macaques, visitors, and local people at Mt. Emei: problems and countermeasures. *Commensalism and conflict: The human-primate interface*, pp.376-399.