

Assessing Human Interactions, Conflict, and Threats with Mammals: Ecological and Conservation Perspectives: a review

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ABSTRACT

The interaction between humans and animals creates a dynamic interface where anthropogenic forces and natural processes intersect. Because they regulate trophic dynamics, disperse seeds, and maintain nutrient cycles, mammals are crucial to ecosystems. But these connections are increasingly shifting because of habitat fragmentation, land use changes, and expanding human populations. Sometimes these things cause fights, like when people destroy fields, kill cattle, steal animals, or kill others to get back at them. These acts are bad for both local jobs and the mammals that live there. This study places current findings about the origins and consequences of conflicts between humans and mammals within broader ecological and conservation frameworks. It reveals that animals are crucial for ecosystems and more vulnerable to human-made issues like illicit trafficking and climate change that disrupt their habitats. In addition to the lack of integration of ecological information, community engagement, and policy enforcement, responses to conservation remain uneven. We argue that evidence-based, locally specific policies that balance biodiversity protection with socioeconomic needs are necessary to reduce human-mammal conflict. This analysis underscores the importance of adaptive,

interdisciplinary conservation strategies for preserving mammalian diversity and ensuring human well-being in shared ecosystems by integrating ecological roles with escalating threats.

Keywords: Anthropogenic, Biodiversity, Ethnomammalogy, Ethno medicine, Predation.

Introduction

Among the many animal species found in Pakistan are 195 mammalian species (Danish et al., 2023). Numerous researchers have focused on the diversity of Pakistan (Bashir et al., 2023) as well as detailing the situation of mammals in various regions and towns around Pakistan (Afsar & Bano, 2013). In Pakistan, there are five species of mammals that are found nowhere else in the world (Altaf et al., 2017). The species comprise the Baluchistan Black Bear (*Ursus thibetanus gerardiana*), Indus Dolphin (*Platanista gangetica minor*), Punjab Urial (*Ovis vignei punjabiensis*), Balochistan Dormouse (*Dryomys niethammeri*), and Woolly Flying Squirrel (*Eupetaurus cinereus*). Numerous mammalian species face danger (Akhtar, Saeed, & Khan, 2014).

Habitat Preference of Mammalian Diversity

Numerous experts observed that certain animal species, which provide food and shelter, have transitioned to agricultural, rural, and urban environments (Khan, Khan, & Chaudhry, 2015). For example, red foxes are extremely rare in the warmer parts of Japanese cities and semi-urban habitats, a phenomenon known as the forest-to-city tilt. This is just one example of how the diversity of mammalian species varies from one region to another, according to studies conducted in various climatic zones around the globe (Jackowiak et al., 2021). The red fox, or *Vulpes vulpes*, is a regular sight in England's metropolitan and semi-urban cooler regions (Bateman & Fleming, 2012). The consequences of urbanization have been extensively examined in developed countries such as the USA, Australia, and Europe; however, research in Asia remains limited and has only recently commenced to a certain degree (Raj & Sharma, 2022). The studies on the effects of mining have revealed detrimental impacts on biodiversity and climate change (PANDEY). An increase in biodiversity conflicts and human-wildlife conflicts is anticipated globally (Young, 2021). presenting difficulties for managers of conservation, particularly the speed at which biodiversity is disappearing (Harvey et al., 2023).

Role of Mammals

They hold significant value for ecosystems and also serve as crucial bio indicators (Harvey et al., 2023).

Role of Mammalian Species in Ecology

Mammals play a crucial role in various ecological systems, including predation, browsing, and seed dispersal, while also providing substantial benefits to humans as sources of food, recreation, and interest. Mammals have been significant forerunners in preservation efforts due to their appeal and the species involved (Ijaz, Adil, Aslam, Kanwal, & Afsheen, 2020).

Ethnomammalogy

Traditional medicines that incorporate animal products, particularly those derived from mammals, hold considerable importance for individuals (Vijayakumar, Prabhu, Yabesh, & Pragashraj, 2015), and numerous mammalian species are traded globally for their medicinal applications. Research and studies in Ethnomammalogy typically encompass field-based surveys aimed at documenting various species of mammals traditionally utilized and the cultural dimensions associated with them (Manzoor, Altaf, Safeer, & Yasrub, 2018). Documentation of traditional ethno medicinal knowledge regarding plants and animals holds significant value for conservation strategies. Various animal species, including mammals, are traded for a multitude of purposes. The data gathered on wild animals, including mammals in these markets, is crucial for conservation managers and policymakers (Whiting et al., 2018). Consequently, data assessment in rural and urban areas worldwide is necessary (Ahmad et al., 2025).

Mammals as Source of Zoonotic Diseases

A significant number of infectious diseases can be transmitted from animals to humans. An exemplary case is primates (Romulo Romeu Nobrega Alves et al., 2021). A recent case illustrates the associated risks as demonstrated by the British Safari Park. Upon the identification of a monkey carrying the herpes simplex virus, a decision is made to humanely eliminate a cohort of clinically healthy macaques (Rômulo Romeu Nóbrega Alves, Souto, Barboza, & Bezerra, 2012). While the agent poses no threat to monkeys, it results in casualties in approximately 80% of cases. Some individuals have seriously considered a hypothesis in which the widespread presence of HIV in the world, responsible for human AIDS infections, may have originated from monkey-borne virus transmission decades ago (R. R. Alves, Souto, & Barboza, 2010).



Threats to Mammals

Diversity has been significantly affected due to the fast growth of the human population worldwide. The burgeoning population has several detrimental effects, including deforestation, climate change, pollution, habitat loss, and the encroachment of invasive species. These are all signs of the supplementary adverse impact (Ijaz et

al., 2020). The increase in population and its associated impacts, including deforestation, habitat destruction, the rise of hunting practices, and the introduction of non-native species, are fundamental factors contributing to the decline of numerous mammalian species in recent times. Threat processes exhibit varying intensities on the Earth's surface, with species residing in more severely impacted regions facing a heightened danger of extinction (Saraswati et al., 2024).

Extensive ecosystems have been reduced to rubble owing to the expansion of new inhabited zones, associated infrastructure, and residential developments, which significantly differ based on the species' native habitats (Simkin, Seto, McDonald, & Jetz, 2022). Naturally natural foliage has been substituted. Furthermore, several indigenous species have been altered due to the introduction of economically advantageous or aesthetically appealing plants (Rolls et al., 2023).

Urbanization and habitat degradation are the main causes of Pakistan's declining animal species and density (Umair, Altaf, & Abbasi, 2017). Factors such as food shortages, changes in vegetation, and pollution are also included. This has resulted in the transformation of naturally occurring ecosystems into urbanized residential areas, forests, and suburban landscapes. The diversity of certain species is enhanced through the provision of moderate nesting opportunities and the identification of suitable locations for controlled urbanization, to a certain degree. In densely populated areas, the removal of natural vegetation has led to a decline in biodiversity and a reduction in thickness (Soulsbury & White, 2015).

Infection significantly contributes to species decline in mammals; for instance, the mortality rate among Lowland Gorillas due to Ebola, which can reach 90% in certain regions, has resulted in a shift in their conservation status from endangered to critically endangered. Illness is emerging as a potential catalyst for rapid decline in certain species (Hoffmann, Hölker, & Eccard, 2022).

The population of Tasmanian devils has declined by over 89% due to the emergence of a transmissible facial carcinoma, first identified in 1996 (Hawkins et al., 2012). Natural habitats are supplanted by urban areas during urbanization, resulting in habitat alterations that convert natural ecosystems into urban ecosystems. To comprehend variety, it is essential to assess the habitat priority of species (Hansen, Kays, & Millspaugh, 2024). Various mammalian species exhibit differing tendencies regarding their proximity to human habitation, with some opting to reside near humans and others preferring slightly or entirely disturbed environments (Haight et al., 2023). Some species are based on environmental behaviors, but others die out or become rare as a result of human influence on mammalian species. Deforestation and habitat loss are results of anthropogenic influences. The greatest number of native species have gone extinct due to urbanization (Fenoglio, Rossetti, & Videla, 2020).

The macro-evolutionary and macro-ecological processes underlying historical and contemporary mammalian biodiversity models are beginning to be explored globally. Diversification studies (Zimova et al., 2023) examine risk mitigation in spatially diverse species-rich models, focusing on body type evolution and life history evolution.

A documented study highlights the importance of understanding these procedures in light of the global extinction crisis. This knowledge is essential for effectively utilizing information to prevent the loss of ecosystem services and future biodiversity

decline (Smith et al., 2010).

Farmland in suburban settings is continually being impacted by mammals, such as herbivores that inhabit forest environments. Livestock in suburban settings is also impacted by wild omnivores and carnivores.

Records indicate that annually, 24% of corn and 14% of wheat crops per hectare are lost, attributed to nocturnal mammalian activity that damages these crops (Ijaz et al., 2020). It has been observed that a mortality rate of 2% in livestock can be attributed to predation by various wild species, including lynx, brown bears, leopards, and wolves. Consequently, individuals are contemplating the eradication of numerous predator species that may lead to conflicts between humans and wildlife. The adverse effects of urbanization are leading to agricultural agitation, pollution, fragmentation of large ecosystems, and alterations in natural climate patterns, all of which pose ongoing threats to mammalian diversity. Conversely, the extinction of numerous species is a consequence of the illegal hunting of humans and the use of body parts from numerous mammal species to manufacture various medications. Consequently, the plan is designed in accordance with the aforementioned objectives (Din, Park, Kim, & Hong, 2025).

Human-Wildlife Conflict

The presence of herbivorous and omnivorous animals in close proximity to forest ecosystems has a detrimental impact on agricultural production (Barua, Bhagwat, & Jadhav, 2013). Similarly, the presence of mammalian carnivores in nearby regions adversely impacts both domestic and commercial animals in rural settings. Mammals typically inflict harm on crops during the nocturnal hours, whereas birds tend to do so at dawn and dusk (Jalais, 2014). It has been established that herbivorous and omnivorous animals, including mammalian species, inflict annual injury on 14% of the wheat crop and 24% of the maize crop per hectare. Wild species such as leopards, lynxes, brown bears, and wolves are responsible for 2% of all animal fatalities, including those in domestic and commercial settings. Conflicts between humans and other animals have resulted in the extinction of several mammalian species (Din et al., 2025).

Human-Mammalian Conflict

Forests have been destroyed and converted to agriculture and cities for 10,000 years. However, agricultural growth began in the late 20th century (Pimentel et al., 2024). Conflicts between people and the natural species have resulted from this (Pintor et al., 2021). The enhancement of agricultural land production and the fortification of agriculture are essential, yet the conservation of species remains equally critical. The relationships between humans and wildlife are extensive and multifaceted. Nevertheless, the increase in population and the demand for additional resources have resulted in tensions between humans and wildlife. This illustrates that humans and wildlife share similar resources, yet humanity has significantly altered or destroyed many of the natural landscapes that support wildlife (Barua et al., 2013).

Conservation of Diversity

There is now an urgent need to protect a share of global threats posed to twelve percent of the global birdlife, twenty-five percent of mammals, forty percent of amphibians and twenty percent of the invertebrates as biodiversity conservation is a complex and interlinked phenomenon. It is logistically challenging to map such intricate patterns that cover the totality of the world and this can only be achieved by identifying and prioritizing key habitats, species and clusters to be subjected to focused management measures (Thomsen & Willerslev, 2015). Contributing to the mounting flood of faunal extinctions, study of habitat variables and their possible role in determining species richness remains an activity that continues to be marginalized in both modern biodiversity evaluation process and practice. Although the use of direct biodiversity monitoring approaches is on the rise, such habit-related variables are not usually probed in details (Pidgeon et al., 2014). There is no doubt that humans play a central role in the protection of species as the representatives of *Homo sapiens* can be located at the top of practically any ecosystem on Earth (Vogiatzakis, Mannion, & Sarris, 2016).

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