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Review Article

“Biodiversity Assessment and Conservation Perspectives of Sailana Kharmour Wildlife Sanctuary, Madhya Pradesh, India”

Nisha Thakre, Sarvar Jahan

Department of Zoology, School of Science, SAM Global University, Raisen 464551, Madhya Pradesh, India

Department of Chemistry, School of Science, SAM Global University, Raisen 464551, Madhya Pradesh, India

Corresponding Author Email: thakrenisha554@gmail.com

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Abstract

Biodiversity conservation has emerged as a critical environmental concern in the context of rapid infrastructure development across India. Linear infrastructure projects such as highways and expressways, although essential for economic growth and regional connectivity, often pose potential threats to fragile ecosystems and wildlife habitats. The present study evaluates the biodiversity status of the Sailana Kharmour Wildlife Sanctuary (SKWLS) located in Ratlam district of Madhya Pradesh, with particular emphasis on the conservation of the endangered Lesser Florican (*Sypheotides indicus*). The study has been carried out in the context of a proposed eight-lane greenfield expressway alignment located in proximity to the sanctuary.

Primary field surveys, consultations with forest officials and local stakeholders, and secondary data analysis of published literature and ecological records were adopted as the core methodology.

Floral and faunal diversity assessments reveal the presence of diverse grassland species, avifauna, reptiles, mammals, and insects, with the sanctuary being an important seasonal habitat for the Lesser Florican, a Schedule I species under the Wildlife Protection Act, 1972. The findings indicate that the proposed expressway alignment does not directly intersect the sanctuary or its eco-sensitive zone; however, indirect impacts related to noise, air pollution, light, and habitat fragmentation were critically evaluated.

The study concludes that with the implementation of scientifically designed mitigation measures, including wildlife crossings, noise and light barriers, grassland restoration, and a comprehensive Environmental Management Plan (EMP), the project is unlikely to cause significant adverse impacts on the biodiversity of the sanctuary. The research highlights the importance of integrating conservation planning with

infrastructure development to achieve sustainable development goals.

Keywords:

Biodiversity, Lesser Florican, Grassland Ecosystem, Wildlife Conservation, Expressway Project, Environmental Management Plan

Introduction

India is recognized as one of the world's megadiverse countries, harboring a wide range of ecosystems, species, and genetic diversity. However, increasing population pressure, urbanization, industrial expansion, and infrastructure development have resulted in substantial stress on natural habitats. Among various ecosystems, grasslands are one of the most neglected and misclassified ecosystems in India, often categorized as wastelands, despite supporting unique biodiversity and endangered species.

Wildlife sanctuaries play a vital role in conserving biodiversity by providing protected habitats for flora and fauna. The SailanaKharmour Wildlife Sanctuary in Madhya Pradesh is a significant grassland ecosystem established primarily for the conservation of the Lesser Florican (*Sypheotides indicus*), one of the most threatened bird species in India. The sanctuary represents an ecologically sensitive region within the Malwa Plateau and

forms part of the Kathiawar–Gir dry deciduous forest ecological zone.

The development of linear infrastructure such as expressways can potentially influence wildlife habitats through habitat fragmentation, increased noise and air pollution, light disturbance, and altered land-use patterns. Therefore, biodiversity impact assessments are essential to evaluate ecological risks and design appropriate mitigation strategies. The present study aims to assess the biodiversity of SailanaKharmour Wildlife Sanctuary and evaluate the potential impacts of a nearby expressway project, with a focus on conservation planning and sustainable development.

Study Area: SailanaKharmour Wildlife Sanctuary

The SailanaKharmour Wildlife Sanctuary is located in Ratlam district of Madhya Pradesh and covers an area of approximately 12.96 square kilometers. The sanctuary comprises three distinct units: Amba (8.51 sq. km), Sherpur (0.91 sq. km), and Shikarwadi (3.54 sq. km). These areas are spatially separated and surrounded by agricultural fields, human settlements, grasslands, and scattered forest patches.

Geographically, the sanctuary lies on the Malwa Plateau and is characterized by dry deciduous vegetation and grassland ecosystems. The region

experiences a semi-arid climate with hot summers, moderate monsoon rainfall, and mild winters. The sanctuary is particularly renowned for providing breeding and seasonal habitat to the Lesser Florican, locally known as Kharmour or Grass Peacock.

Although the proposed expressway alignment does not pass through the sanctuary or its notified eco-sensitive zone, the nearest point of alignment lies approximately 3.5 km from the Shikarwadi section of the sanctuary. Existing land-use patterns between the sanctuary and the project area include villages, agricultural land, roads, and wind energy installations, indicating a landscape already influenced by anthropogenic activities.

Objectives of the Study

The specific objectives of the present research are:

1. To assess the floral and faunal diversity of the SailanaKharmour Wildlife Sanctuary and surrounding areas.
2. To evaluate the conservation status and habitat requirements of the Lesser Florican (*Sypheotides indicus*).
3. To analyze the potential impacts of the proposed expressway project on biodiversity and ecosystem components.
4. To suggest appropriate mitigation measures and an Environmental

Management Plan (EMP) for biodiversity conservation.

5. To recommend long-term conservation strategies for sustainable management of grassland ecosystems.

Methodology

The methodology adopted for the study involved a combination of primary and secondary data collection techniques. Primary data were collected through field surveys conducted in and around the SailanaKharmour Wildlife Sanctuary. The field visits included direct observation of habitats, identification of flora and fauna, photographic documentation, and interaction with forest department officials, local communities, and range officers.

Secondary data were collected through an extensive review of literature, including biodiversity reports, wildlife management plans, published research articles, forest department records, and conservation guidelines issued by the Ministry of Environment, Forest and Climate Change (MoEFCC), Government of India. Species identification was carried out using standard field guides and taxonomic references.

Environmental impact assessment tools were used to evaluate potential impacts related to noise, air quality, and habitat fragmentation. Predictive modeling for noise and air pollution dispersion

was reviewed to assess indirect impacts on wildlife habitats. The integration of field data and secondary information facilitated a comprehensive assessment of biodiversity and conservation needs.

Floral Diversity

The floral diversity of the study area reflects the characteristics of dry deciduous forests and grassland ecosystems. Dominant tree species recorded include *Tectona grandis* (Teak), *Butea monosperma* (Palash), *Acacia nilotica*, *Acacia catechu*, *Ficus religiosa*, and *Prosopis juliflora*. These species are interspersed with shrub and herbaceous vegetation.

Shrub species such as *Adhatodavasica*, *Zizyphus jujuba*, and *Cassia tora* are commonly found, while herbaceous flora includes *Achyranthes aspera*, *Ageratum conyzoides*, and *Oxalis corniculata*. The grassland is dominated by species such as *Cenchrus ciliaris*, *Chrysopogon fulvus*, *Cynodon dactylon*, *Heteropogon contortus*, and *Themeda quadrivalvis*.

These grass species play a crucial role in supporting herbivores and avifauna, particularly the Lesser Florican, which depends on tall grasslands for breeding and nesting. The presence of invasive species such as *Prosopis juliflora* and *Parthenium hysterophorus* poses a threat to native

grassland biodiversity and requires active management.

Faunal Diversity

The faunal diversity of the Sailana Kharmour Wildlife Sanctuary and its surroundings is moderately rich and includes a variety of mammals, reptiles, amphibians, birds, insects, and fish species. Mammals recorded in the area include Blue Bull (*Boselaphus tragocamelus*), Indian Fox (*Vulpes bengalensis*), Jungle Cat (*Felis chaus*), Hyena (*Crocuta crocuta*), Rabbit (*Lepus nigricollis*), and Porcupine (*Hystrix indica*).

Reptilian fauna includes Indian Cobra (*Naja naja*), lizards, and rat snakes, while amphibians such as frogs and toads are associated with seasonal water bodies. Avifaunal diversity is significant, with species such as Black Kite (*Milvus migrans*), Sarus Crane (*Grus antigone*), Lesser Whistling Duck (*Dendrocygna javanica*), mynas, crows, sparrows, and owls recorded.

The sanctuary serves as a seasonal habitat and breeding ground for the Lesser Florican, making avifaunal conservation a priority. Insect diversity, including butterflies and pollinators, contributes to ecosystem stability and food web dynamics.

Status of Lesser Florican (Endangered Species)

The Lesser Florican (*Sypheotides indicus*) is an endemic bird species of India and is categorized as Endangered on the IUCN Red List. It is protected under Schedule I of the Wildlife Protection Act, 1972, providing it the highest level of legal protection. The species is primarily associated with grassland habitats and is known for its distinctive breeding display during the monsoon season.

The population of the Lesser Florican has witnessed a sharp decline over the past few decades due to habitat loss, conversion of grasslands to agriculture, excessive grazing, use of pesticides, wind energy installations, and hunting. Field observations and forest department records indicate that only a few individuals have been sighted in recent years within the Shikarwadi range of the sanctuary.

Conservation of this species requires the protection and restoration of tall grasslands, maintenance of habitat mosaics, and minimization of anthropogenic disturbances during the breeding season.

Impact of Expressway Project on Biodiversity

The proposed expressway project is a greenfield, access-controlled alignment that does not directly intersect the SailanaKharmour Wildlife Sanctuary or its eco-sensitive zone. However, potential

indirect impacts were assessed, including noise pollution.

Conclusion

The present study highlights the ecological importance of the SailanaKharmour Wildlife Sanctuary located in Ratlam district of Madhya Pradesh, which represents a unique grassland ecosystem supporting diverse floral and faunal species. The sanctuary plays a crucial role in providing seasonal breeding habitat for the endangered Lesser Florican (*Sypheotides indicus*), a flagship species of Indian grasslands and one of the most threatened birds in the country.

The biodiversity assessment conducted during the study indicates the presence of a variety of plant species, grassland vegetation, mammals, reptiles, birds, and insects that collectively contribute to the ecological stability of the region. The grassland habitat within the sanctuary is particularly important for maintaining the breeding behavior and survival of the Lesser Florican during the monsoon season. However, the ecosystem faces several challenges, including habitat degradation, agricultural expansion, invasive plant species, and increasing anthropogenic pressure.

The evaluation of the proposed expressway project suggests that the alignment does not directly pass through the sanctuary or its eco-

sensitive zone. Nevertheless, potential indirect impacts such as noise disturbance, air pollution, artificial lighting, and habitat fragmentation may influence wildlife movement and behavior if not properly managed. Therefore, the implementation of scientifically designed mitigation measures, including wildlife crossing structures, noise and light barriers, habitat restoration programs, and a comprehensive Environmental Management Plan (EMP), is essential to minimize ecological disturbances.

Overall, the study emphasizes that infrastructure development and biodiversity conservation must be integrated through careful environmental planning and policy implementation. Long-term conservation strategies such as grassland habitat restoration, monitoring of Lesser Florican populations, community participation, and strict regulation of anthropogenic activities are necessary to ensure the sustainable management of the sanctuary ecosystem.

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