

Wildlife Diversity of Jammu Region with Recent Trends in Conservation and Biodiversity Management

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Abstract

The Jammu region, located in the southern part of the Union Territory of Jammu and Kashmir, possesses remarkable biological diversity owing to its unique geographical location, varied topography, diverse climatic conditions, and wide altitudinal gradients. The region encompasses subtropical forests, temperate forests, alpine meadows, wetlands, riverine ecosystems, and mountainous landscapes that support a rich assemblage of flora and fauna. Numerous mammalian species, birds, reptiles, amphibians, fishes, and invertebrates inhabit these ecosystems, including several endangered, endemic, and globally significant wildlife species. However, increasing anthropogenic pressures, habitat fragmentation, climate change, deforestation, illegal hunting, invasive species, and unplanned developmental activities pose serious threats to biodiversity conservation. Protected areas, wildlife sanctuaries, conservation reserves, and community participation have become integral components of biodiversity management in the region. This review summarizes the wildlife diversity of the Jammu region, major ecosystems, faunal richness, protected area networks, recent conservation initiatives, biodiversity management strategies, existing challenges, and future directions for sustainable wildlife conservation.

Keywords: Wildlife diversity, Jammu region, Biodiversity, Conservation, Protected areas, Mammals, Birds, Wetlands, Wildlife management, Sustainable development.

1. Introduction

Biodiversity forms the foundation of ecosystem stability and provides essential ecological services, including nutrient cycling, climate regulation, pollination, soil conservation, and water purification. The Himalayan region is recognized as one of the world's most important biodiversity hotspots because of its exceptional species richness, habitat diversity, and high levels of endemism. Within this landscape, the Jammu region occupies a unique ecological position by connecting the subtropical plains of northern India with the temperate and alpine ecosystems of the western Himalayas [1]. The Jammu region comprises a wide range of habitats including subtropical scrub forests, dry deciduous forests, pine forests, broad-leaved forests, riverine ecosystems, grasslands, wetlands, and mountainous landscapes. These diverse habitats support numerous wildlife species, ranging from large mammals such as leopards and Himalayan black bears to hundreds of bird species, reptiles, amphibians, fishes, and insects [2]. The region also serves as an important migratory route for many resident and migratory birds.

Over recent decades, wildlife conservation has gained increasing importance because expanding human settlements, infrastructure development, agricultural intensification, climate change, and illegal exploitation of natural resources have placed growing pressure on natural ecosystems. Jammu and Kashmir maintain an extensive protected-area network comprising national parks, wildlife sanctuaries, conservation

reserves, and wetland reserves that collectively safeguard significant portions of regional biodiversity. Conservation efforts increasingly emphasize habitat restoration, species monitoring, community participation, and scientific management. This review provides an overview of wildlife diversity in the Jammu region while highlighting recent advances in biodiversity conservation and sustainable wildlife management.

2. Geographical Features and Wildlife Habitats of Jammu Region

The Jammu region occupies the southern part of the Union Territory of Jammu and Kashmir and includes diverse physiographic zones extending from the Shivalik foothills to the Pir Panjal mountain ranges. Elevation varies from approximately 300 m to over 5,000 m above sea level, creating substantial climatic and ecological variation across relatively short distances [3]. The region experiences subtropical, temperate, and alpine climatic conditions that support numerous habitat types. Low-altitude areas are dominated by subtropical thorn forests, dry deciduous forests, riverine vegetation, and agricultural landscapes. Mid-elevation regions contain chir pine forests, mixed broad-leaved forests, and temperate woodlands, whereas higher elevations support coniferous forests, alpine meadows, rocky habitats, and high-altitude grasslands.

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Wetland ecosystems including Mansar Lake, Surinsar Lake, Gharana Wetland, and several seasonal marshes provide critical habitat for migratory birds, aquatic organisms, amphibians, reptiles, and fish species. River systems such as the Chenab, Tawi, Ujh, Ravi, and Basantar further contribute to aquatic biodiversity by supporting diverse freshwater fauna. This remarkable habitat diversity enables coexistence of tropical, temperate, and Himalayan wildlife species within the Jammu region.

Table 1: Major Habitat Types in Jammu Region

Habitat Type	Dominant Characteristics	Major Wildlife
Subtropical forests	Dry deciduous vegetation	Leopard, jackal, langur
Pine forests	Chir pine dominated	Barking deer, pheasants
Broad-leaved forests	Oak and mixed vegetation	Himalayan black bear
Wetlands	Lakes and marshes	Migratory water birds
River ecosystems	Freshwater habitats	Fish, turtles, amphibians
Alpine meadows	High-altitude grasslands	Himalayan mammals

3. Wildlife Diversity of Jammu Region

The Jammu region supports rich faunal diversity because of its varied ecological conditions and geographical position within the Himalayan landscape. Mammals constitute one of the most conspicuous vertebrate groups, with species including the leopard (*Panthera pardus*), Himalayan black bear (*Ursus thibetanus*), Asiatic wild boar (*Sus scrofa*), barking deer (*Muntiacus muntjak*), sambar (*Rusa unicolor*), goral (*Naemorhedus goral*), rhesus macaque (*Macaca mulatta*), gray langur (*Semnopithecus* spp.), jackal (*Canis aureus*), Indian fox (*Vulpes bengalensis*), jungle cat (*Felis chaus*), and porcupine (*Hystrix indica*). Higher elevations also provide habitat for several Himalayan mammals in suitable landscapes. The region is equally important for avian diversity. Resident and migratory birds include peafowl, red junglefowl, kalij pheasant, partridges, kingfishers, herons, egrets, ducks, geese, cranes, raptors, owls, woodpeckers, barbets, bulbuls, flycatchers, wagtails, and numerous passerines. Wetlands such as Gharana serve as important wintering sites for thousands of migratory waterfowl arriving through the Central Asian Flyway [4]. Reptilian diversity includes Indian cobra, common krait, Russell's viper, rat snakes, monitor lizards, freshwater turtles, and several species of lizards and geckos. Amphibians such as frogs and toads occupy forest streams, wetlands, and agricultural landscapes. Freshwater ecosystems support numerous fish species that contribute to ecological balance and local fisheries. Invertebrates including butterflies, moths, bees, dragonflies, beetles, ants, spiders, and pollinating insects play indispensable ecological roles in pollination, nutrient cycling, decomposition, and food web dynamics.

Table 2: Major Wildlife Groups of Jammu Region

Wildlife Group	Representative Species
Mammals	Leopard, Himalayan black bear, sambar, barking deer, wild boar
Birds	Kalij pheasant, peafowl, ducks, cranes, kingfishers
Reptiles	Cobra, krait, monitor lizard, freshwater turtles
Amphibians	Frogs and toads
Fish	Mahseer and freshwater fishes of Himalayan rivers
Invertebrates	Butterflies, bees, dragonflies, beetles

4. Protected Areas and Wildlife Conservation Initiatives

The Jammu region possesses an extensive network of protected areas that plays a vital role in conserving wildlife and maintaining ecological balance. These protected landscapes safeguard critical habitats for numerous mammals, birds, reptiles, amphibians, and plant species while supporting ecosystem services such as watershed protection, carbon sequestration, and biodiversity conservation [5].

Important protected areas include Jasrota Wildlife Sanctuary, Nandini Wildlife Sanctuary, Ramnagar Wildlife Sanctuary, Rajparian Wildlife Sanctuary, Limber Wildlife Sanctuary, and Surinsar–Mansar Wildlife Sanctuary. Wetlands such as Gharana Wetland Conservation Reserve and Mansar–Surinsar Lakes are internationally recognized for supporting migratory birds and aquatic biodiversity. These areas provide breeding habitats, migration corridors, and refuge for threatened wildlife species [6]. Forest departments, research institutions, universities, and local communities jointly undertake wildlife monitoring, anti-poaching activities, habitat restoration, afforestation, wetland conservation, and environmental awareness programs. Camera trapping, GIS mapping, remote sensing, and drone-based monitoring have recently improved wildlife population assessment and habitat management.

Table 3: Major Protected Areas in Jammu Region

Protected Area	District	Major Conservation Importance
Nandini Wildlife Sanctuary	Jammu	Mammals and bird diversity
Jasrota Wildlife Sanctuary	Kathua	Dry deciduous forests and wildlife
Ramnagar Wildlife Sanctuary	Udhampur	Leopard and ungulate conservation
Surinsar–Mansar Wildlife Sanctuary	Jammu	Wetland and migratory birds
Gharana Wetland Conservation Reserve	Jammu	Migratory waterfowl habitat
Rajparian Wildlife Sanctuary	Pir Panjal region	Himalayan wildlife conservation

5. Threats to Wildlife Diversity

Despite considerable conservation efforts, wildlife in the Jammu region faces numerous anthropogenic and environmental threats. Habitat degradation resulting from urban expansion, road construction, mining, agricultural intensification, hydroelectric projects, and deforestation has fragmented natural ecosystems and reduced wildlife populations [7]. Illegal hunting and wildlife trade continue to threaten several mammal, bird, and reptile species. Human–wildlife conflict has increased in recent years as expanding settlements encroach upon forest habitats, leading to crop damage, livestock predation, and occasional attacks on humans by wild animals such as leopards and bears [8]. Climate change has emerged as another major challenge by altering rainfall patterns, increasing temperatures, changing vegetation composition, and affecting the availability of food and water resources. Wetland degradation, invasive plant species, forest fires, pollution, and unregulated tourism further contribute to biodiversity loss.

Table 4: Major Threats to Wildlife in Jammu Region

Threat	Impact on Biodiversity
Habitat fragmentation	Decline in wildlife populations
Illegal hunting	Species depletion
Deforestation	Habitat loss
Climate change	Ecosystem alteration
Forest fires	Vegetation destruction
Human–wildlife conflict	Increased wildlife mortality
Wetland degradation	Loss of migratory bird habitats

6. Recent Trends in Biodiversity Conservation and Management

Recent conservation strategies increasingly integrate scientific research with community participation. Geographic Information Systems (GIS), satellite remote sensing, camera traps, radio telemetry, drones, and environmental DNA (eDNA) techniques are being used for wildlife monitoring and habitat assessment. These technologies improve species identification, migration tracking, habitat mapping, and conservation planning [9]. Community-based conservation has gained importance by involving local residents, village committees, forest protection groups, and non-governmental organizations in habitat restoration and wildlife protection. Environmental education programs conducted in schools and colleges promote biodiversity awareness among younger generations [10].

Afforestation, watershed restoration, wetland rehabilitation, invasive species management, and ecological corridor development have become major conservation priorities. Government initiatives under national biodiversity policies, wildlife protection legislation, and ecosystem restoration programs further strengthen conservation efforts across the region.

8. Conclusion

The Jammu region represents one of the biologically diverse landscapes of the western Himalayan ecosystem, supporting a remarkable variety of mammals, birds, reptiles, amphibians, fishes, and invertebrates across subtropical forests, temperate woodlands, wetlands, river systems, and mountainous habitats. This rich biodiversity plays an essential role in maintaining ecological balance, supporting ecosystem services, and contributing to regional environmental sustainability. Protected areas, wildlife sanctuaries, conservation reserves, and wetland ecosystems have significantly contributed to safeguarding wildlife populations and conserving critical habitats. Recent advances in wildlife monitoring through GIS, remote sensing, camera trapping, drones, and molecular ecological techniques have improved scientific understanding of species distribution and conservation needs. Simultaneously, increasing community participation and environmental education have strengthened biodiversity conservation at the local level. However, habitat fragmentation, climate change, illegal hunting, forest degradation, pollution, invasive species, and human-wildlife conflict continue to threaten the long-term survival of many wildlife species. Addressing these challenges requires integrated conservation strategies that combine scientific research, habitat restoration, effective law enforcement, sustainable land-use planning, and active community involvement.

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