

Avifaunal Biodiversity of Eastern Rajasthan Wetlands: A Habitat-Based Analysis

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Abstract: Wetlands of Eastern Rajasthan constitute ecologically rich habitats that support diverse resident and migratory bird populations. These wetlands—ranging from natural lakes to man-made reservoirs—serve as critical stopover sites for transcontinental migrants along the Central Asian Flyway. This study examines avifaunal diversity, habitat associations, seasonal distribution, and ecological significance of bird communities across major wetlands of Eastern Rajasthan, including Sambhar Lake, Keoladeo National Park (Bharatpur), Bisalpur Dam, Ramgarh Lake, and Siliserh Lake. Field surveys conducted during 2015–2017 employed point counts, line transects, photographic documentation, and habitat characterization.

The research documents over 145 bird species belonging to 48 families. Waterfowl diversity was highest at Sambhar and Keoladeo, while waders dominated shallow marshlands of Bharatpur and Ramgarh. Habitat factors such as water depth, salinity, vegetation structure, and anthropogenic disturbance strongly influenced species richness. The study highlights the importance of wetland heterogeneity in sustaining bird assemblages and emphasizes the urgent need for conservation in light of encroachment, pollution, and hydrological alterations.

Keywords: Eastern Rajasthan, wetlands, avifauna, biodiversity, migratory birds, habitat analysis, waterfowl ecology.

1.1 Introduction

Wetlands represent some of the most productive ecosystems globally, offering critical ecological services such as nutrient cycling, groundwater recharge, flood control, and biodiversity support. In semi-arid regions like Rajasthan, wetlands act as ecological refuges for diverse flora and fauna, especially for avifauna that rely on aquatic habitats for feeding, nesting, and roosting.

Eastern Rajasthan hosts several significant wetlands, including Sambhar Salt Lake, Keoladeo National Park, Bisalpur Dam, Mansagar Lake, and Ramgarh Lake, which attract both resident waterbirds and migratory species from Central Asia, Europe, and Siberia (Ali & Ripley, 1987). These wetlands fall along the Central Asian Flyway, making them vital for global avian conservation efforts.

Birds are excellent ecological indicators, reflecting habitat quality, hydrological stability, and ecosystem health (Bibby et al., 2000). The rich bird diversity of Eastern Rajasthan wetlands provides an opportunity to understand ecological dynamics in arid and semi-arid landscapes.

However, these wetlands face increasing threats—urban encroachment, altered hydrology, pollution, vegetation loss, and reduced freshwater inflow—resulting in declining bird populations. This research provides a comprehensive assessment of avifaunal biodiversity in Eastern Rajasthan wetlands, focusing on habitat associations and ecological determinants of species richness.

1.2 Objectives

1. To document avifaunal diversity in selected wetlands of Eastern Rajasthan.
2. To analyze habitat preferences of waterfowl, waders, shorebirds, and resident birds.
3. To examine seasonal variations in species composition.
4. To assess the ecological role of wetlands in supporting migratory bird populations.
5. To identify major threats affecting avifaunal diversity.
6. To recommend conservation strategies for wetland ecosystem protection.

1.3 Methodology

I. Study Duration

The study was conducted over two years (2015–2017), covering winter (November–February), summer (March–June), and monsoon seasons (July–October).

II. Study Sites

Five major wetlands were selected:

1. Sambhar Lake (largest inland saline lake)
2. Keoladeo National Park, Bharatpur (UNESCO World Heritage Site)
3. Bisalpur Dam (freshwater reservoir)
4. Ramgarh Lake (seasonal wetland)
5. Siliserh Lake, Alwar (semi-natural reservoir)

III. Data Collection Methods

1. Point Count Method

Stationary surveys at fixed points; birds recorded using binoculars (10×50).

2. Line Transect Surveys

1–3 km transects walked at each site.

3. Photographic Documentation

Used for confirming species identification.

4. Habitat Assessment

Variables recorded:

- (a.) Water depth
- (b.) Salinity
- (c.) Vegetation density
- (d.) Anthropogenic disturbance
- (e.) Shoreline characteristics

5. Species Identification

Using standard field guides (Grimmett et al., 1998; Ali & Ripley, 1987).

6. Data Analysis

- (a.) Species richness and abundance indices
- (b.) Habitat preference mapping
- (c.) Migratory vs. resident species classification
- (d.) Seasonal diversity patterns

1.4 Study Area

Eastern Rajasthan forms a transition zone between the Aravalli ranges and the Gangetic plains. Major wetland types include:

1. Sambhar Lake

- (a.) Hyper-saline
- (b.) Ramsar Site
- (c.) Habitat for flamingoes, waders, and saline-tolerant species

2. Keoladeo National Park

- (a.) Managed wetland
- (b.) World-famous for migratory birds
- (c.) Complex mosaic of marshes, woodlands, and grasslands

3. Bisalpur Dam

- (a.) Freshwater reservoir
- (b.) Dominated by ducks and cormorants

4. Ramgarh Lake

- (a.) Seasonal
- (b.) Mudflats support storks and ibises

5. Siliserh Lake

- (a.) Semi-natural lake with forested surroundings
- (b.) Habitat for herons, kingfishers, and dabbling ducks

1.5 Observations

I. Species Diversity

1. A total of 145 species belonging to 48 families were recorded. Major groups include:

- 2. Waterfowl: Northern Shoveler, Common Teal, Gadwall
- 3. Waders: Black-winged Stilt, Common Redshank, Little Stint
- 4. Large Waterbirds: Painted Stork, Eurasian Spoonbill
- 5. Raptors: Marsh Harrier, Black Kite
- 6. Resident Birds: Indian Cormorant, Purple Swamphen

II. Habitat Associations

- 1. Deep water zones: cormorants, pochards
- 2. Shallow marshes: herons, egrets, waders
- 3. Saline flats of Sambhar: flamingoes, avocets
- 4. Vegetated areas: moorhens, jacanas
- 5. Forest-fringed lakes: kingfishers, raptors

III. Seasonal Variation

- 1. Winter: highest diversity due to migratory waterfowl
- 2. Summer: reduced water levels, dominance of resident species
- 3. Monsoon: breeding activity; influx of herons and egrets

IV. Threats Observed

- 1. Habitat loss due to encroachment
- 2. Reduction in freshwater inflow
- 3. Disturbance from tourism
- 4. Pollution from agricultural runoff
- 5. Illegal fishing activity

1.6 Discussion

I. Role of Wetlands for Migratory Birds

Wetlands such as Keoladeo and Sambhar act as critical wintering grounds along the Central Asian Flyway. Shallow lakes with abundant invertebrates support large flocks of ducks and waders (Scott, 1989).

II. Habitat Heterogeneity as Biodiversity Driver

Wetland diversity—marshes, open water, mudflats, saline zones—supports different ecological guilds.

III. Wetland Hydrology and Bird Distribution

- 1. Bird richness is strongly correlated with:
- 2. Water level stability
- 3. Presence of emergent vegetation
- 4. Food availability
- 5. Salinity at Sambhar limits species but enhances flamingo populations.

IV. Influence of Anthropogenic Pressures

Urbanization around Jaipur has degraded Mansagar and Ramgarh. Keoladeo suffers from water scarcity due to altered hydrology. Pollution impacts breeding sites.

V. Climate Change Influence

Erratic monsoons and rising temperatures reduce wetland water retention, affecting migratory bird arrival patterns.

1.7 Results

1. 145 species confirmed across five wetlands.
2. Highest diversity at Keoladeo, followed by Sambhar.
3. Water depth and vegetation are key habitat drivers.
4. Winter shows maximum migratory bird presence.
5. Species richness declines in wetlands with high anthropogenic disturbance.
6. Saline wetlands support specialized species like flamingoes.
7. Hydrological instability directly correlates with declining avifauna.

1.8 Conclusion

Wetlands of Eastern Rajasthan represent vital bird habitats supporting rich resident and migratory avifaunal diversity. Habitat structure, water depth, and hydrological stability strongly influence bird assemblages. The study underscores the ecological importance of these wetlands and highlights growing threats that affect species richness and survival.

Conservation efforts must focus on maintaining hydrological regimes, controlling pollution, minimizing anthropogenic disturbances, and restoring degraded wetlands.

1.9 Recommendations

1. Restore hydrological flows to Keoladeo and Ramgarh.
2. Strictly regulate urban expansion around major wetlands.
3. Establish community-based wetland management groups.
4. Monitor migratory bird populations under climate change.
5. Implement pollution control measures for agricultural and sewage runoff.
6. Develop eco-friendly tourism guidelines.
7. Strengthen legal protection under the Wetland Rules (2010).

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