



**ORIGINAL RESEARCH PAPER**

**Zoology**

**DIVERSITY OF MIGRATORY BIRDS AT CHANDLAI LAKE, JAIPUR (RAJASTHAN) DURING THE YEARS 2024–2025.**

**KEY WORDS:**

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**ABSTRACT**

Wetlands are among the most productive ecological systems and serve as essential habitats for resident and migratory waterbirds. Chandlai Lake, located near Jaipur in Rajasthan, represents one such important freshwater wetland that supports diverse avifaunal communities during winter. The present study documents the diversity and seasonal occurrence of waterbirds at Chandlai Lake from April 2024 to March 2025, with the objective of assessing the lake's ecological condition and its importance as a wintering site. Field observations were conducted during early morning and late afternoon hours using direct visual methods supported by binoculars, DSLR camera documentation and standard identification guides. A total of 19 bird species were recorded during the study period, comprising several winter migrants such as Northern Shoveler, Northern Pintail, Common Teal, Gadwall and Ruddy Shelduck, along with resident species including Little Grebe, Indian Spot-billed Duck, Black-winged Stilt, Common Coot, Moorhen, herons, egrets and cormorants. Migratory waterfowl began arriving after the monsoon, with peak abundance noted between November and January when water levels, prey availability and habitat conditions were optimal. The results indicate that Chandlai Lake continues to function as an important seasonal habitat for migratory ducks and waders; however, signs of ecological stress were evident. Reduced water clarity, algal growth, pollution inputs and habitat disturbance were observed during several months, potentially affecting the distribution and abundance of sensitive species. Declines in certain waterbirds reported in regional accounts reinforce the need for conservation attention. The study highlights that sustainable management of water resources, regulation of pollutant discharge and community-based awareness initiatives are essential for maintaining the lake's ecological health. Overall, the findings emphasize the significance of Chandlai Lake as a regional winter refuge and underscore the need for continued monitoring and conservation efforts to protect its avian diversity.

**INTRODUCTION**

Bird migration is one of the most fascinating natural processes in which thousands of birds travel long distances every year in response to seasonal changes in their native habitats. When winter conditions in northern and central Asian regions become harsh and the ground remains frozen for long periods, the natural food cycle is disrupted and insects, vegetation, fish, and other prey become scarce. In such circumstances, migratory birds leave their breeding grounds and move toward warmer regions where water, food, shelter and suitable resting places are available. Wetlands of India, especially those in Rajasthan, become important wintering sites because they fill with monsoon water and support abundant aquatic life such as insects, worms, larvae, molluscs, plankton, small fish and amphibians, all of which provide rich feeding opportunities for migratory species.

Chandlai Lake, located near Jaipur, is one of the significant wetlands that attracts a wide variety of resident as well as migratory birds every year. After the rainy season, as the lake accumulates fresh water and aquatic vegetation begins to develop, several species start appearing during the autumn months, followed by a peak arrival in winter. The lake's shallow edges, mudflats and open water zones create suitable habitats for different feeding guilds including waders, ducks, geese, herons, ibis and flamingos. Over the past decade, Chandlai Lake has gained recognition among birdwatchers for supporting species such as Greater Flamingo (*Phoenicopterus roseus*), Northern Shoveler (*Spatula clypeata*), Common Teal (*Anas crecca*), Gadwall (*Mareca strepera*), Black-winged Stilt (*Himantopus himantopus*), Common Coot (*Fulica atra*), Eurasian Spoonbill (*Platalea leucorodia*), Painted Stork (*Mycteria leucocephala*) and several other winter visitors. Their presence reflects the ecological productivity of the lake during this period.

However, like many peri-urban wetlands in Rajasthan, Chandlai Lake also faces increasing environmental pressures. Industrial discharge from nearby areas, sewage inflow, agricultural runoff, siltation and human disturbance around the lake margins can affect water quality and reduce suitable habitat for birds. Seasonal fluctuations in water level,

salinity and dissolved oxygen may influence the abundance of aquatic prey and consequently the distribution of migratory species. Studying bird diversity during a full annual cycle therefore provides important insights into how the lake supports wildlife and how human activities may be shaping its ecological conditions.

The present work aims to document the migratory bird species observed at Chandlai Lake during the period April 2024 to March 2025 and to understand their seasonal occurrence pattern. By comparing observations with known ecological characteristics of the lake and available online records, this study highlights the significance of Chandlai as a wintering site for water birds and emphasizes the need for its ecological protection and long-term conservation.

**METHODOLOGY AND MATERIALS:**

**Study Area and Data Collection**

The present investigation was carried out at Chandlai Lake, a freshwater wetland located near Chandlai village in Jaipur district, Rajasthan, approximately 30 km southeast of Jaipur city. The lake lies close to 26.70°N latitude and 75.88°E longitude and is known to support a wide assemblage of resident and migratory water birds during the winter months.

The study covered a complete annual cycle from April 2024 to March 2025, enabling documentation of bird activity across pre-monsoon, monsoon, post-monsoon and winter seasons. Field visits were conducted twice during each sampling day, specifically during early morning hours (06:30–09:30 AM) and late afternoon (4:30–6:30 PM), as these times coincide with peak foraging and movement of most water birds.

All observations were recorded directly from vantage points along the lake margins without disturbing the habitat. Field notes were systematically documented in a dedicated notebook. Additional information regarding seasonal bird occurrence and perceived changes in the lake environment was informally collected from local villagers, fishermen and frequent visitors around the lake area.

**Bird Identification and Status Classification**

Bird species encountered during the study were identified

using a combination of direct visual observation, photographic documentation, and standard ornithological references. The following equipment and tools were used:

- Olympus Binocular 10×50 for long-range observations
- Canon 1500D DSLR camera with telephoto lens for capturing diagnostic features
- iPhone 16 Pro for short-range imaging and digital field notes
- The Book of Indian Birds (Salim Ali) for identification guidance

Species identification was based on morphological traits, behaviour, flight patterns, feeding posture, and in some cases vocal calls. All identifications were cross-verified using reputable online resources, including Birds of the Indian Subcontinent, bird species records for Chandlai Lake, and other credible digital field guides.

Each species was classified according to its residential status—Resident, Winter Migrant, Passage Migrant, or Local Visitor—based on field evidence and corroborated with authentic online datasets. Photographs were taken whenever possible to confirm plumage characteristics and reduce observer bias.

**Data Analysis**

Observational data—including species presence, relative abundance, flock size, and migratory timing—were organized chronologically to identify seasonal patterns and changes in habitat use across the year. Comparative analysis was performed across the major seasonal phases to determine peak migratory periods and to distinguish common winter visitors from irregular or occasional migrants.

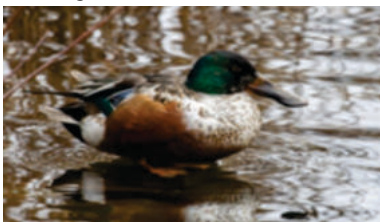
Since the objective of the study was to document migratory bird diversity rather than conduct statistical modelling, analysis remained primarily descriptive, focusing on patterns observed during field visits. Cross-referencing with online records supported the validation of migratory timing and helped identify any species not personally sighted but reliably reported during the same period by knowledgeable observers.

**Observations**

A total of 19 avian species were recorded at Chandlai Lake during the study period, comprising both winter migrants and resident or locally moving species. Expanded descriptions of key species observed are given below.

**1. Northern Shoveler (*Spatula clypeata*)**

A common winter visitor distinguished by its broad, spoon-shaped bill adapted for filtering plankton and small invertebrates. Large flocks were frequently observed occupying shallow open waters. Males displayed bright breeding plumage, while females remained cryptic for effective camouflage.

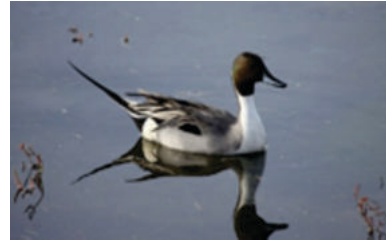


**Photo 1: Alexis Lours, CC BY 4.0, Wikimedia Commons.**

**2. Northern Pintail (*Anas acuta*)**

A Northern Pintail is a graceful dabbling duck recognized by its slender neck and elongated central tail feathers. It belongs to the family Anatidae and is a regular winter migrant to freshwater wetlands of Rajasthan. The species was often recorded in mixed flocks with Northern Shoveler and Common Teal at Chandlai Lake. It showed a preference for

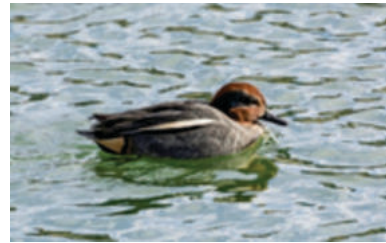
moderate-depth waters, where it foraged mainly by upending and surface dabbling. Pintails were most frequently observed during early morning hours, indicating peak feeding activity during this time.



**Photo 2: Basar, CC BY 3.0, Wikimedia Commons.**

**3. Common Teal (*Anas crecca*)**

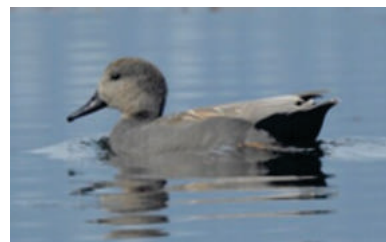
Common Teal is one of the smallest duck species recorded at Chandlai Lake during the study period. These birds favored shallow muddy margins and were highly active during early morning hours. Their rapid flight and tight flocking behavior made them easy to distinguish from other dabbling ducks. Males were identified by a distinctive green eye patch bordered with buff, while females showed mottled brown plumage. The species was frequently observed feeding on aquatic vegetation, seeds, and small invertebrates in shallow water zones.



**Photo 3: Jacek Halicki, CC BY 4.0, Wikimedia Commons.**

**4. Gadwall (*Mareca strepera*)**

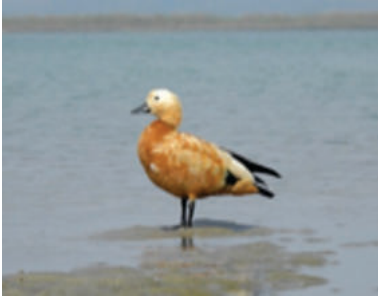
Gadwall is a medium-sized duck characterized by subtle grey-brown plumage and a comparatively inconspicuous appearance. It was frequently observed associating with Northern Pintail and Eurasian Wigeon at Chandlai Lake. Gadwalls mainly grazed on submerged aquatic vegetation and occasionally fed on surface invertebrates. The species preferred calm, open water zones with abundant vegetation and was generally seen in small to medium-sized flocks. Feeding activity was most prominent during early morning and late afternoon hours.



**Photo 4: Tisha Mukherjee, CC BY 4.0, Wikimedia Commons.**

**5. Ruddy Shelduck (*Tadorna ferruginea*)**

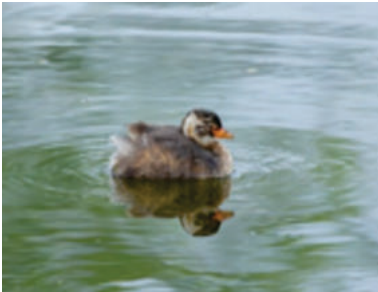
Ruddy Shelduck, locally known as the Brahminy Duck, was regularly observed in pairs or small groups at Chandlai Lake. Their loud and resonant calls were frequently heard during early morning hours. Individuals showed a preference for open water bodies and gently sloping banks for resting and foraging. The species displayed territorial behavior, particularly during feeding, and was often seen actively grazing on aquatic vegetation and small invertebrates. Ruddy Shelducks were observed throughout the study period, indicating regular use of the lake as a feeding and resting habitat.



**Photo 5: Tisha Mukherjee, CC BY 4.0, Wikimedia Commons.**

**6. Little Grebe (*Tachybaptus ruficollis*)**

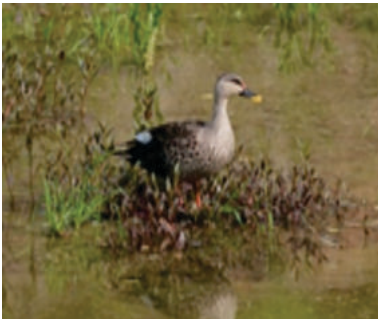
Little Grebe is a small diving bird commonly found throughout the year at Chandlai Lake. It displayed exceptional diving abilities and was frequently observed carrying its young on its back during the breeding season. The species occupied vegetated edges and quiet backwaters of the lake. During breeding months, individuals showed a rufous patch on the neck and face, making them easily identifiable. Little Grebes primarily fed on small fish, aquatic insects and larvae, diving repeatedly for short durations.



**Photo 6: Tisha Mukherjee, CC BY 4.0, Wikimedia Commons.**

**7. Indian Spot-billed Duck (*Anas poecilorhyncha*)**

Indian Spot-billed Duck was frequently observed in pairs or small family groups at Chandlai Lake. The prominent yellow-tipped bill with black spots is its key distinguishing feature. The species exhibited typical dabbling behavior while feeding in shallow water zones. Individuals remained active throughout most seasons, indicating year-round residency. They were commonly seen feeding on aquatic vegetation, seeds, and small invertebrates, particularly during early morning and late afternoon hours.



**Photo 7: Satdeep Gill, CC BY 4.0, Wikimedia Commons.**

**8. Grey Heron (*Ardea Cinerea*)**

Grey Heron is a tall wading bird commonly observed around the deeper parts of Chandlai Lake. It is known for its patient stalking technique, often remaining motionless for long periods before striking at prey. The species was frequently recorded during both morning and evening surveys. Grey Herons primarily fed on fish, frogs, and other aquatic organisms. Individuals were usually solitary and maintained a considerable distance from human activity while foraging.



**Photo 8: Quartl, CC BY 3.0, Wikimedia Commons.**

**9. Purple Heron (*Ardea Purpurea*)**

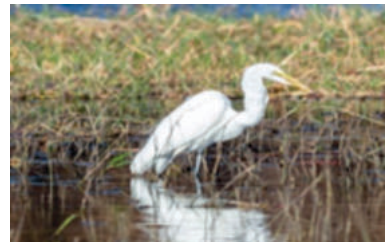
Purple Heron is a slender wading bird that preferred areas with dense emergent vegetation at Chandlai Lake. It was noted for its chestnut-streaked neck and secretive behavior, often remaining concealed within reeds. The species was generally solitary in comparison to other herons. Purple Herons were observed hunting quietly for fish and amphibians in shallow water zones. Sightings were more frequent during early morning hours when disturbance around the lake was minimal.



**Photo 9: Tisha Mukherjee, CC BY 4.0, Wikimedia Commons.**

**10. Great Egret (*Ardea Alba*)**

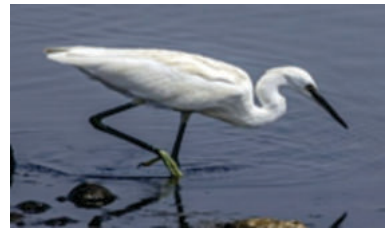
Great Egret is a large white egret characterized by its long neck and distinctive yellow bill. It was commonly observed foraging along shorelines and near reed beds at Chandlai Lake. The species often accompanied spoonbills and storks while feeding in shallow waters. Great Egrets primarily preyed on fish, frogs and aquatic insects.



**Photo 10: Diego Delso, CC BY 4.0, Wikimedia Commons.**

**11. Little Egret (*Egretta Garzetta*)**

Little Egret is a small-sized egret distinguished by its slender black bill and contrasting yellow feet. It was observed to be a highly active feeder, frequently using foot-stirring movements to disturb and capture prey. The species was common along shallow edges and muddy margins of Chandlai Lake. Little Egrets mainly fed on small fish, aquatic insects, and crustaceans. They were often recorded moving quickly through shallow waters, especially during early morning observations.



**Photo 11: Charles J. Sharp, CC BY 4.0, Wikimedia Commons.**

**12. Cattle Egret (Bubulcus ibis)**

Cattle Egret was frequently encountered both near Chandlai Lake and in the surrounding agricultural fields. The species was often observed following livestock to capture insects disturbed by their movement. Its numbers showed a noticeable increase after the monsoon season. Cattle Egrets primarily fed on terrestrial insects such as grasshoppers and beetles, rather than aquatic prey. They were usually seen in small groups and displayed high tolerance to human presence in the study area.



**Photo 12: El Golli Mohamed, CC BY 4.0, Wikimedia Commons.**

**13. Black-winged Stilt (Himantopus Himantopus)**

Black-winged Stilt is a slender wading bird easily recognized by its elongated pink legs and striking black-and-white plumage. It was frequently observed in small to medium-sized groups foraging in shallow mudflats at Chandlai Lake. The species fed mainly on aquatic insects and small invertebrates. Individuals exhibited loud and sharp alarm calls when disturbed by human activity or predators.



**Photo 13: Charles J. Sharp, CC BY 4.0, Wikimedia Commons.**

**14. Red-wattled Lapwing (Vanellus Indicus)**

Red-wattled Lapwing was commonly observed in exposed mudflat areas around Chandlai Lake. The species is well known for its distinctive “did-you-do-it” alarm call, which was frequently heard during field surveys. It often alerted other birds to potential disturbances in the surrounding area. The lapwing fed mainly on insects and other small invertebrates picked from the ground. Individuals were usually seen in pairs and showed strong territorial behavior, especially near nesting sites.



**Photo 14: Charles J. Sharp, CC BY 4.0, Wikimedia Commons.**

**15. Common Coot (Fulica Atra)**

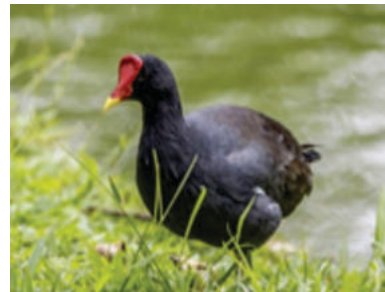
Common Coot was frequently observed in large flocks at Chandlai Lake. The species is a strong swimmer, easily identified by its black body and distinctive white frontal shield. Individuals were often seen engaging in vigorous territorial chases, particularly during the breeding period. Common Coots primarily fed on aquatic vegetation, algae, and small invertebrates. They preferred open water areas and were active throughout the day.



**Photo 15: Charles J. Sharp, CC BY 4.0, Wikimedia Commons.**

**16. Common Moorhen (Gallinula Chloropus)**

Common Moorhen preferred areas with dense emergent vegetation around Chandlai Lake, using reeds and aquatic plants for cover. Its red-and-yellow bill made the species easy to detect among thick vegetation. The bird was typically shy in nature and avoided open water whenever possible. Common Moorhens were observed feeding on aquatic plants, seeds, and small invertebrates. They were most active during early morning and late evening hours, often moving cautiously along vegetated margins.



**Photo 16: Charles J. Sharp, CC BY 4.0, Wikimedia Commons.**

**17. Indian Cormorant (Phalacrocorax Fuscicollis)**

Indian Cormorant is a medium-sized diving bird commonly observed at Chandlai Lake. It was often seen perched on rocks or branches with wings spread out for drying after feeding. The species foraged by actively pursuing fish underwater. Indian Cormorants were frequently recorded during afternoon survey sessions. They were usually observed either singly or in small groups near deeper water zones of the lake.



**Photo 17: Charles J. Sharp, CC BY 4.0, Wikimedia Commons.**

**18. Great Cormorant (Phalacrocorax Carbo)**

Great Cormorant is larger and more robust in appearance compared to the Indian Cormorant. It was mainly observed occupying deeper water zones of Chandlai Lake, where diving success for fish capture was higher. The species occasionally roosted on dead trees and elevated structures along the lake margins. Great Cormorants foraged either singly or in small groups and were seen diving for extended durations. They were most frequently recorded during late morning and afternoon observation periods.



Photo 18: Charles J. Sharp, CC BY 4.0, Wikimedia Commons.

**19. Pied Kingfisher (Ceryle Rudis)**

Pied Kingfisher is easily identifiable by its striking black-and-white coloration and distinctive hovering hunting technique. It was repeatedly observed diving into the water to capture



Photo 19: Charles J. Sharp, CC BY 4.0, Wikimedia Commons.

**Table 1: List of Waterbird Species Recorded at Chandlai Lake. (2024–2025).**

No.	Common Name	Scientific Name	IUCN Status	Residential Status	Feeding Habit	Feeding Guild
1	Northern Shoveler	<i>Spatula clypeata</i>	LC	Winter Migrant	Filter feeder	Surface feeder
2	Northern Pintail	<i>Anas acuta</i>	LC	Winter Migrant	Dabbling, grazing	Surface feeder
3	Common Teal	<i>Anas crecca</i>	LC	Winter Migrant	Dabbling	Surface feeder
4	Gadwall	<i>Mareca strepera</i>	LC	Winter Migrant	Grazing, dabbling	Herbivore / omnivore
5	Ruddy Shelduck	<i>Tadorna ferruginea</i>	LC	Winter Migrant	Omnivorous	Omnivore
6	Little Grebe	<i>Tachybaptus ruficollis</i>	LC	Resident	Diving on fish/inverts	Piscivore
7	Indian Spot-billed Duck	<i>Anas poecilorhyncha</i>	LC	Resident	Dabbling	Omnivore
8	Grey Heron	<i>Ardea cinerea</i>	LC	Resident	Stalking fish	Piscivore
9	Purple Heron	<i>Ardea purpurea</i>	LC	Resident	Ambush predator	Piscivore
10	Great Egret	<i>Ardea alba</i>	LC	Resident	Stalking fish	Piscivore
11	Little Egret	<i>Egretta garzetta</i>	LC	Resident	Stirring, surface feeding	Piscivore
12	Cattle Egret	<i>Bubulcus ibis</i>	LC	Resident	Insect feeding	Insectivore
13	Black-winged Stilt	<i>Himantopus himantopus</i>	LC	Local Migrant	Probing	Invertivore
14	Red-wattled Lapwing	<i>Vanellus indicus</i>	LC	Resident	Ground feeding	Insectivore
15	Common Coot	<i>Fulica atra</i>	LC	Local Migrant	Grazing + diving	Omnivore
16	Common Moorhen	<i>Gallinula chloropus</i>	LC	Resident	Grazing + picking	Omnivore
17	Indian Cormorant	<i>Phalacrocorax fuscicollis</i>	LC	Resident	Pursuit diving	Piscivore
18	Great Cormorant	<i>Phalacrocorax carbo</i>	LC	Local Migrant	Diving for fish	Piscivore
19	Pied Kingfisher	<i>Ceryle rudis</i>	LC	Resident	Hover-diving	Piscivore

LC:Least concern species.

**RESULT AND DISCUSSION:**

During the present study at Chandlai Lake, a total of 19 waterbird species were recorded between April 2024 and March 2025. These included a good number of winter migrants such as Northern Shoveler, Northern Pintail, Common Teal and Gadwall, which arrived soon after the monsoon and stayed throughout the winter season. Resident species like Little Grebe, Indian Spot-billed Duck, Common Coot, Common Moorhen, herons, egrets and cormorants were observed during almost all months of the year, indicating that the lake continues to support essential habitat features for local bird communities.

It was observed that the arrival of migratory ducks increased notably during November and December when water levels were stable, and aquatic prey availability was high. Although Chandlai Lake received moderate monsoon inflow in 2024, the richness of migratory birds remained satisfactory, suggesting that even partial water retention can support feeding grounds for dabbling and wading species. However, the overall abundance of some sensitive species appeared lower than in past years, which agrees with recent reports indicating a gradual decline in bird numbers at this lake due to environmental pressures.

Field observations and local information suggested that pollution, untreated sewage inflow, and increasing disturbance around the lake margins are major concerns.

small fish. The species usually occupied exposed perches with clear visibility of the water surface. Pied Kingfishers were highly active during daylight hours and showed precise hunting behavior. Individuals were commonly seen singly or in pairs near shallow and moderately deep water zones.

Reduced water clarity, algal growth, and shrinking mudflat zones were noted during several months, affecting the preferred feeding areas of waders and herons. Declining fish populations—reported in recent news articles—may also impact diving birds and predatory species. These factors collectively pose challenges to the long-term survival of several wetland-dependent birds at Chandlai.

Migratory birds perform essential ecological roles, including controlling insect populations, supporting nutrient cycling and maintaining food-web balance in wetland ecosystems. However, rapid habitat degradation, loss of natural wetlands, overuse of water resources, pollution from nearby settlements and industries, and increasing human encroachment have led to a noticeable decline in biodiversity in many regions of Rajasthan. Chandlai Lake is no exception to these pressures. Over extraction of water in summer months and unregulated activities around the lake further disturb the ecological balance required for sustaining migratory species.

To prevent further decline, there is a strong need for strict regulation of pollutant discharge, protection of remaining wetland zones, and controlled human movement around the lake during peak migratory months. Awareness drives at local and village levels should be organized to educate communities about the ecological importance of water birds and the need to conserve wetlands like Chandlai. Active participation by government bodies, environmental agencies and NGOs will be essential to restore habitat quality and

ensure that this lake continues to serve as a safe winter refuge for migratory birds in the future.

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