



RESEARCH ARTICLE

DISTRIBUTION REFINEMENT AND CONSERVATION IMPLICATIONS OF SMOOTH-COATED OTTER (*LUTROGALE PERSPICILLATA*) IN ASAN BARRAGE WETLAND, UTTARAKHAND, INDIA

Arun Kumar¹, Javed Anver², Ashok Kumar¹ and Ujjwal Kumar³

¹BSNV PG College, University of Lucknow, Lucknow, 226001; ²SGS, Jubail, Saudi Arabia, 35514

³Wildlife Institute of India, Dehradun, 248001

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*Corresponding author: Arun Kumar

ABSTRACT

The Smooth-coated Otter (*Lutrogale perspicillata*) is a semi-aquatic carnivore widely distributed across South and Southeast Asia and is recognized as a key bioindicator of freshwater ecosystem health. Despite its broad distribution, site-specific records from several Himalayan foothill wetlands remain limited. The present study documents a baseline observation of (*L. perspicillata*) from Asan Barrage Wetland, Uttarakhand, India (30.4338473°N, 77.6726059°E), recorded during a biodiversity baseline survey on 31 December 2023. A solitary individual was observed exhibiting typical foraging behaviour, including swimming, diving, and surfacing within shallow water zones along riparian vegetation. Asan Barrage, a Ramsar site, is situated where the Asan and Yamuna rivers merge, and it harbors heterogeneous wetland habitats, which are favorable for aquatic life. Although this species is known to inhabit riverine ecosystems in Uttarakhand, documentation of this species from this wetland was lacking. This record is important in providing baseline data on the species, and it also underscores the importance of this wetland as a potential habitat for Smooth-coated Otters. In light of rising anthropogenic influences such as habitat alteration, tourism, and water pollution in freshwater ecosystems, this study reiterates the importance of conserving this species and its habitat, which is crucial in wetlands of the Himalayan foothills, and *L. perspicillata* acts as a flagship species for freshwater conservation in this region.

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INTRODUCTION

Otters are carnivorous and semi-aquatic mammals belonging to the family Mustelidae and are considered apex predators in aquatic ecosystems. Being apex consumers, otters are considered to be very important in maintaining ecological balance by controlling fish and invertebrate populations, thereby affecting aquatic food web processes (Roos et al., 2015; Awasthi et al., 2025). Being dependent on clean water, adequate food availability, and pristine riparian habitats, otters are considered very important bioindicators for assessing the health and quality of riverine and wetland ecosystems (Kruuk, 2006; Wright et al., 2021). There are thirteen species of otters distributed worldwide in a variety of aquatic, marine, and terrestrial ecosystems (Roos et al., 2015). In India, there are three species of otters, and these are Eurasian Otter (*Lutra lutra*), Smooth-coated Otter (*Lutrogale perspicillata*), and Asian Small-clawed Otter (*Aonyx cinereus*) (Hussain et al., 2017; Hussain et al., 2013; Awasthi et al., 2019).

Despite their ecological significance, information regarding the distribution, population status, and habitat characteristics of otters in India is limited, especially in riverine and wetland ecosystems of the Himalayan foothills (Bhardwaj et al., 2025; Basak et al., 2021). The Smooth-coated Otter (*L. perspicillata*) is the largest otter species in South Asia and is characterized by a smooth, dense coat, a streamlined body, a flattened tail, and webbed feet, all of which facilitate efficient aquatic movement (Narasimmarajan et al., 2021; Roos et al., 2021). The species is highly social, typically occurring in family groups, and is commonly associated with rivers, lakes, wetlands, reservoirs, estuaries, and mangroves, where fish constitute the primary component of its diet (Khoo & Lee, 2020; Hussain, 1997). The geographical distribution of *L. perspicillata* spans South and Southeast Asia, including India, Nepal, Bangladesh, Sri Lanka, Myanmar, Thailand, Malaysia, Indonesia, and southern China (Roos et al., 2015; Wright et al., 2021). In India, the species has been recorded from major river systems such as the Ganga and Brahmaputra, as well as

various peninsular rivers and associated wetlands, floodplains, and riparian zones with high fish productivity (Hussain *et al.*, 2017; Hussain *et al.*, 2013; Basak *et al.*, 2021). Despite its wide distribution, the Smooth-coated Otter is experiencing population declines across much of its range due to habitat degradation, wetland conversion, water pollution, overfishing, and illegal wildlife trade (Gomez *et al.*, 2016; Wright *et al.*, 2021). Consequently, the species is categorized as Vulnerable on the IUCN Red List and is protected under Schedule I of the Indian Wildlife (Protection) Act, 2022 (Wright *et al.*, 2021; Dias *et al.*, 2025). Due to increased anthropogenic pressures such as river regulation, sand mining, and human disturbances in South Asia, otters are threatened in these regions (Gomez *et al.*, 2016; Hussain, 1997). The Riverine habitats and Wetlands in the Himalayan foothills are identified as potential habitats for Smooth-coated Otters due to the presence of appropriate ecological conditions (Basak *et al.*, 2021; Awasthi *et al.*, 2019). However, studies on the distribution and presence of Smooth-coated Otters in these habitats are limited, and there is a lack of baseline data on the mammalian fauna in several Wetlands in Northern India. Asan Barrage Wetland (Asan Wetland) in Dehradun District, Uttarakhand State, India, is one of the ecologically most significant Freshwater Wetlands in the Himalayan foothill regions. The Wetland is situated at the confluence of the Asan River and Yamuna River (Tabassum *et al.*, 2025; Singh *et al.*, 2024). The Wetland has been included in the Ramsar List for its importance for migratory waterfowl (Tabassum *et al.*, 2025). Though there are several studies on the avifaunal diversity of this Wetland, there is a lack of data on the presence of mammalian predators such as otters in this Wetland. Although Smooth-coated Otter species have been found in riverine systems of Uttarakhand, including foothill regions (Basak *et al.*, 2021), site-level information from key wetland sites such as Asan Barrage remains limited. While existing studies have provided a general overview of species distribution from existing literature and regional species checklists, site-level ecological information from such an important Ramsar site remains limited (Kumar *et al.*, 2022). Species occurrence from such an important wetland site needs to be documented. In this context, the present study aims to document the occurrence of the Smooth-coated Otter (*L. perspicillata*) at Asan Barrage Wetland, Uttarakhand, India, and to highlight the ecological importance of the wetland for the conservation of this species.

METHODS AND METHODOLOGY

STUDY AREA: Asan Barrage Wetland, also known as the Asan Conservation Reserve, is located near Dakpathar in Dehradun District, Uttarakhand, India, within the outer Himalayan foothills of the Shivalik range. The observation site recorded in the present study lies at 30.4338473°N and 77.6726059°E, at the confluence of the Asan and Yamuna rivers, forming a shallow freshwater reservoir and associated wetland ecosystem (**Fig. 1**). This wetland represents an important hydrological junction within the upper Gangetic River basin and supports diverse aquatic habitats characteristic of Himalayan foothill ecosystems (Basak *et al.*, 2021; Singh *et al.*, 2024). The wetland exhibits a heterogeneous habitat structure comprising open water, marshes, mudflats, sandy banks, and riparian vegetation. Such habitat diversity supports rich biodiversity, including fish, amphibians, reptiles, water birds, and semi-aquatic mammals. Riparian zones and gently sloping banks provide suitable resting and denning sites for

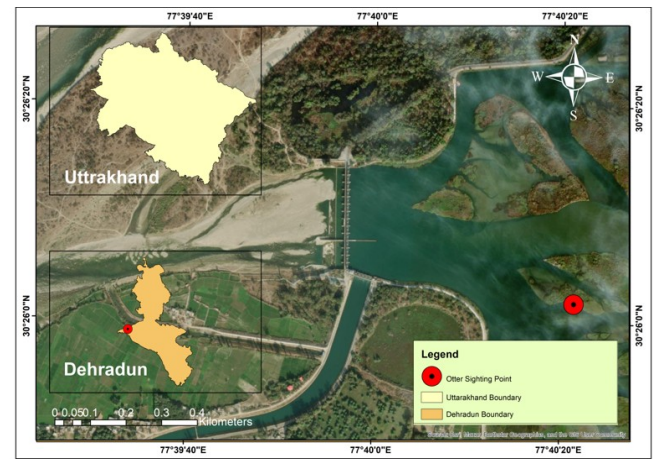


Figure 1. Map of Asan Barrage Wetland showing the observation location (30.4338473°N, 77.6726059°E)

aquatic predators, while shallow water areas serve as productive foraging grounds due to abundant fish resources, thereby supporting piscivorous species such as otters (Awasthi *et al.*, 2025; Maurya *et al.*, 2025). Recognized for its ecological importance, Asan Wetland was designated as a Ramsar Site in 2020. The wetland receives nutrient-rich inflows from the Asan and Yamuna rivers, promoting high primary productivity and a complex aquatic food web. The region experiences a sub-tropical monsoon climate with seasonal fluctuations in water levels, creating dynamic habitat conditions suitable for species such as the Smooth-coated Otter (*Lutrogale perspicillata*) (Singh *et al.*, 2024; Tabassum *et al.*, 2025).

METHODOLOGY

Field observations were carried out as part of the field visit at Asan Barrage Wetland, Uttarakhand, on 31st December 2023 at approximately 14:20 hrs. Wildlife observations were conducted with the help of 8x42 binoculars, while photographic records were obtained with the help of a Canon PowerShot SX60 HS camera. Identification of the species was based on the presence of characteristic morphological features as discussed in standard field guides on the identification of mammals, as well as relevant scientific literature on otters based on the morphological features of the body architecture, texture of the fur, and the morphology of the tail. Observations on the behavior and ecology of the species were recorded throughout the survey period. These observations were used to document the presence of semi-aquatic mammals along the wetland periphery.

RESULTS

During the field survey conducted on 31 December 2023, a solitary Smooth-coated Otter (*L. perspicillata*) was observed along the vegetated banks of the Asan Barrage wetland at coordinates 30.4338473°N, 77.6726059°E (**Fig. 2**). The individual was recorded in shallow water zones and exhibited characteristic behaviour including swimming, diving, and repeated surfacing associated with foraging activity. The observation lasted approximately 10–15 minutes, during which the animal remained active within the shallow water region before retreating into dense riparian vegetation along the riverbank. The presence of the species in this habitat indicates the availability of suitable ecological conditions, including prey resources and vegetative cover, within the wetland ecosystem.



Figure 2. Photographic record of Smooth-coated Otter observed at the study site

DISCUSSION

The present observation strongly confirms the continued presence of the Smooth-coated Otter (*Lutrogale perspicillata*) in the Asan Barrage wetland ecosystem, situated in the Himalayan foothills of Uttarakhand, and provides a site-specific baseline record for this ecologically significant Ramsar wetland. Although the species has been reported from several riverine systems across Uttarakhand (Basak *et al.*, 2021; Khan *et al.*, 2014), detailed documentation from Asan Barrage remains scarce, with existing regional checklists relying on occurrence records that are more than a decade old (Kumar *et al.*, 2022). Consequently, this study contributes valuable baseline information for assessing the current distribution of the species in Himalayan foothill wetlands and supports future monitoring and conservation efforts.

Smooth-coated otters are identified as keystone species and bioindicators, and their presence is indicative of the availability of prey, hydrological stability, and low levels of habitat disturbance (Maurya *et al.*, 2025; Awasthi *et al.*, 2025). The observed habitat characteristics at Asan Barrage, such as the presence of shallow zones, riparian vegetation, and fish resources, are in accordance with the habitat requirements of the species (Narasimmarajan *et al.*, 2021; Khoo & Lee, 2020). Similar habitat preferences and behavioral patterns have been observed in other riverine and wetland habitats in South and Southeast Asia (Dias *et al.*, 2022; Amavisca *et al.*, 2025). Freshwater habitats in South Asia are increasingly under threat due to various anthropogenic disturbances, including pollution, habitat destruction, overfishing, and disturbances caused by humans (Gomez *et al.*, 2016; Wright *et al.*, 2021). Considering the Asan Barrage habitat, increased tourism activities, agricultural runoff, and habitat alteration may have negative impacts on the biodiversity of the habitat and may reduce the habitat suitability for otters (Dias *et al.*, 2023; Tabassum *et al.*, 2025). Given these challenges, the presence of *L. perspicillata* highlights both the ecological integrity of the wetland and the need for targeted conservation interventions. Conservation measures should include protection of riparian habitats, regulation of anthropogenic activities, and long-term ecological monitoring. Community-based conservation and sustainable fisheries management are also essential to ensure the persistence of otter populations in this region (Awasthi *et al.*, 2024; Abdullah-Fauzi *et al.*, 2025).

CONCLUSION

The present study provides a site-specific baseline record of the Smooth-coated Otter (*L. perspicillata*) from Asan Barrage

Wetland (30.4338473°N, 77.6726059°E), contributing to the understanding of its distribution in Uttarakhand and the Himalayan foothill region. The presence of this apex form of a semi-aquatic predator reflects the ecological health and functional importance of the wetland habitat, as otters are well known to act as bio-indicators of healthy freshwater habitats with adequate prey bases and minimum disturbance. This observation reflects the ecological importance of Asan Barrage habitat and emphasizes the need to protect such riverine wetland habitats facing increased anthropogenic disturbances. Conservation strategies are necessary to protect such otter populations. In addition, studies such as camera trapping, spraint analysis, etc., are recommended to assess the status of such populations and to adopt appropriate strategies for their conservation.

ETHICS STATEMENT: The manuscript presents research on animals that do not require ethical approval for their study.

AUTHOR CONTRIBUTION: All authors contributed equally in survey, data collection, drafting and co-reviewing.

CONFLICT OF INTEREST: The authors declare that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

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